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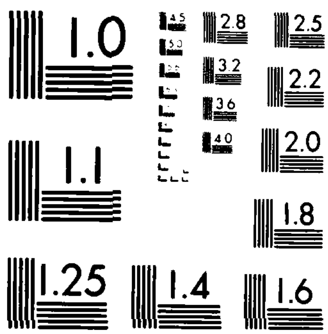

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M-X/MPS

ENVIRONMENTAL

TECHNICAL REPORT

PRELIMINARY FEIS

REVIEW COPY 2 OCTOBER 1981

ETR 19
TRANSPORTATION

DEPLOYMENT AREA SELECTION
AND LAND WITHDRAWAL/
ACQUISITION

DEPARTMENT OF THE AIR FORCE

M-X ETR-19

ENVIRONMENTAL CHARACTERISTICS OF ALTERNATIVE DESIGNATED DEPLOYMENT AREAS: TRANSPORTATION

Prepared for

United States Air Force
Ballistic Missile Office
Norton Air Force Base California

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By

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2 October 1981

DEPARTMENT OF THE AIR FORCE
WASHINGTON 20330

OFFICE OF THE ASSISTANT SECRETARY

Federal, State and Local Agencies

On October 2, 1981, the President announced his decision to complete production of the M-X missile, but cancelled the M-X Multiple Protective Shelter (MPS) basing system. The Air Force was, at the time of these decisions, working to prepare a Final Environmental Impact Statement (FEIS) for the MPS site selection process. These efforts have been terminated and the Air Force no longer intends to file a FEIS for the MPS system. However, the attached preliminary FEIS captures the environmental data and analysis in the document that was nearing completion when the President decided to deploy the system in a different manner.

The preliminary FEIS and associated technical reports represent an intensive effort at resource planning and development that may be of significant value to state and local agencies involved in future planning efforts in the study area. Therefore, in response to requests for environmental technical data from the Congress, federal agencies and the states involved, we have published limited copies of the document for their use. Other interested parties may obtain copies by contacting:

National Technical Information Service
United States Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161
Telephone: (703) 487-4650

Sincerely,

JAMES F. BOATRIGHT
Deputy Assistant Secretary
of the Air Force (Installations)

1 Attachment
Preliminary FEIS

TABLE OF CONTENTS

		Page
Introduction		1
1.0	Project Description	3
1.1	Project Roads	3
1.2	Traffic	5
1.2.1	Construction	6
1.2.1.1	DDA Construction	6
1.2.1.2	Operating Base Construction	7
1.2.2	Assembly and Checkout	7
1.2.3	Movement of Missile Components	7
1.2.4	Operations	8
1.2.4.1	DDA Operations	8
1.2.4.2	Operating Bases	8
2.0	Summary of Impacts	11
2.1	Proposed Action	11
2.1.1	DDA - Accessibility	11
2.1.2	DDA - Traffic	11
2.1.3	DDA - Road Maintenance	12
2.1.4	Operating Bases and Their Vicinities	12
2.1.4.1	Coyote Spring	12
2.1.4.2	Milford	13
2.2	Alternative 1	13
2.3	Alternative 2	13
2.4	Alternative 3	14
2.5	Alternative 4	14
2.6	Alternative 5	14
2.7	Alternative 6	14
2.8	Alternative 7	15
2.9	Alternative 8	15
3.0	Baseline Environment	17
3.1	Nevada/Utah Deployment Area	17
3.2	Texas/New Mexico Deployment Area	26
3.3	Proposed Operating Base Locations	30

Page

3.3.1 Beryl, Utah 30
3.3.2 Coyote Spring, Nevada 34
3.3.3 Delta, Utah 34
3.3.4 Ely, Nevada 34
3.3.5 Milford, Utah 37
3.3.6 Clovis, New Mexico 37
3.3.7 Dalhart, Texas 37

4.0 Project Effects and Analysis 43

4.1 Nevada/Utah Deployment Area 43

4.1.1 Accessibility 43
4.1.2 Traffic 43
4.1.3 Maintenance 65

4.2 Texas/New Mexico Deployment Area 66

4.2.1 Accessibility 66
4.2.2 Traffic 66
4.2.3 Maintenance 86

4.3 Proposed Operating Base Locations 86

4.3.1 Beryl, Utah 86
4.3.2 Coyote Spring, Nevada 90
4.3.3 Delta, Utah 93
4.3.4 Ely, Nevada 93
4.3.5 Milford, Utah 95
4.3.6 Clovis, New Mexico 99
4.3.7 Dalhart, Texas 99

5.0 Mitigations 103

6.0 Methodology and Assumptions - Traffic Estimates 107

6.1 Theory of Traffic Forecasting 107
6.2 Method of Analysis - Operating Bases 108

6.2.1 Forecasting 108

6.2.1.1 Future Baseline Traffic 108
6.2.1.2 M-X-Related Traffic 109
6.2.1.3 Trip Generation 109

6.2.2 Traffic Assignment 111

6.3 Method of Analysis - Deployment Area 111

6.3.1 Construction Traffic 111

			Page
	6.3.2	Commuting and Recreation Traffic	113
6.4	Capacity Analysis		113
7.0	Effects on Railroads and Airlines		117
7.1	Railroads - Nevada/Utah		117
7.2	Railroads - Texas/New Mexico		117
7.3	Airlines - Nevada/Utah		120
7.4	Airlines - Texas/New Mexico		120
References			121

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LIST OF FIGURES

Figure		Page
3.1-1	Existing road system, Nevada/Utah	18
3.1-2	Difficult alignment locations, Nevada/Utah highways	19
3.1-3	Existing traffic volumes, Nevada/Utah	21
3.1-4	Communities with over 500 population, Nevada/Utah	24
3.1-5	Existing traffic volumes for Ely, Eureka, Caliente, Pioche, and Tonopah, Nevada	25
3.2-1	Existing road system and traffic volumes, Texas/New Mexico	27
3.2-2	Selected communities of over 1,000 population, Texas/New Mexico	29
3.2-3	Existing traffic volumes for Dalhart and Hartley, Texas	31
3.2-4	Existing traffic volumes for Hereford and Dimmitt, Texas	32
3.3.1-1	Existing road network and traffic volumes in the vicinity of Beryl, Utah	33
3.3.2-1	Existing road network and traffic volumes in the vicinity of Coyote Spring, Nevada	35
3.3.3-1	Existing road network and traffic volumes in the vicinity of Delta, Utah	36
3.3.4-1	Existing road network and traffic volumes in the vicinity of Ely, Nevada	38
3.3.5-1	Existing road network and traffic volumes in the vicinity of Milford, Utah	39
3.3.6-1	Existing road network and traffic volumes in the vicinity of Clovis, New Mexico	40
3.3.7-1	Existing road network and traffic volumes in the vicinity of Dalhart, Texas	41
4.1-1	Projected daily commute traffic by construction and A&CO personnel in 1985 for the Proposed Action	48

Figure		Page
4.1-2	Projected daily commute traffic by construction and A&CO personnel in 1986 for the Proposed Action	49
4.1-3	Projected daily commute traffic by construction and A&CO personnel in 1987 for the Proposed Action	50
4.1-4	Projected daily commute traffic by construction and A&CO personnel in 1988 for the Proposed Action	51
4.1-5	Projected recreation traffic by construction and A&CO personnel living in construction camps in 1985 for the Proposed Action	53
4.1-6	Projected recreation traffic by construction and A&CO personnel living in construction camps in 1986 for the Proposed Action	54
4.1-7	Projected recreation traffic by construction and A&CO personnel living in construction camps in 1987 for the Proposed Action	55
4.1-8	Projected recreation traffic by construction and A&CO personnel living in construction camps in 1988 for the Proposed Action	56
4.1-9	Projected daily commute traffic by construction and A&CO personnel in 1985 for Alternative 8	57
4.1-10	Projected daily commute traffic by construction and A&CO personnel in 1986 for Alternative 8	58
4.1-11	Projected daily commute traffic by construction and A&CO personnel in 1987 for Alternative 8	59
4.1-12	Projected daily commute traffic by construction and A&CO personnel in 1988 for Alternative 8	60
4.1-13	Projected recreation traffic by construction and A&CO personnel living in construction camps in 1985 for Alternative 8, Split Basing	61
4.1-14	Projected recreation traffic by construction and A&CO personnel living in construction camps in 1986 for Alternative 8, Split Basing	62
4.1-15	Projected recreation traffic by construction and A&CO personnel living in construction camps in 1987 for Alternative 8, Split Basing	63

Figure		Page

Figure		Page
4.1-16	Projected recreation traffic by construction and A&CO personnel living in construction camps in 1988 for Alternative 8, Split Basing	64
4.2-1	Projected daily commute traffic by construction and A&CO personnel in 1985 for Alternative 7	67
4.2-2	Projected daily commute traffic by construction and A&CO personnel in 1986 for Alternative 7	68
4.2-3	Projected daily commute traffic by construction and A&CO personnel in 1987 for Alternative 7	69
4.2-4	Projected daily commute traffic by construction and A&CO personnel in 1988 for Alternative 7	70
4.2-5	Projected recreation traffic for construction and A&CO personnel living in construction camps in 1985 for Alternative 7	72
4.2-6	Projected recreation traffic for construction and A&CO personnel living in construction camps in 1986 for Alternative 7	73
4.2-7	Projected recreation traffic for construction and A&CO personnel living in construction camps in 1987 for Alternative 7	74
4.2-8	Projected recreation traffic for construction and A&CO personnel living in construction camps in 1988 for Alternative 7	75
4.2-9	Projected daily commute traffic by construction and A&CO personnel in 1985 for Alternative 8, Split Basing	78
4.2-10	Projected daily commute traffic by construction and A&CO personnel in 1986 for Alternative 8, Split Basing	79
4.2-11	Projected daily commute traffic by construction and A&CO personnel in 1987 for Alternative 8, Split Basing	80
4.2-12	Projected daily commute traffic by construction and A&CO personnel in 1988 for Alternative 8, Split Basing	81
4.2-13	Projected recreation traffic for construction and A&CO personnel living in construction camps in 1985 for Alternative 8, Split Basing	82
4.2-14	Projected recreation traffic for construction and A&CO personnel living in construction camps in 1986 for Alternative 8, Split Basing	83

Figure		Page
4.2-15	Projected recreation traffic for construction and A&CO personnel living in construction camps in 1987 for Alternative 8, Split Basing	84
4.2-16	Projected recreation traffic for construction and A&CO personnel living in construction camps in 1988 for Alternative 8, Split Basing	85
4.3.1-1	Projected traffic volumes in the vicinity of the Beryl Utah first OB	88
4.3.1-2	Projected traffic volumes in the vicinity of the Beryl, Utah second OB	89
4.3.2-1	Projected traffic volumes in the vicinity of the Coyote Spring, Nevada first OB	91
4.3.2-2	Projected traffic volumes in the vicinity of the Coyote Spring, Nevada second OB	92
4.3.3-1	Projected traffic volumes in the vicinity of the Delta, Utah OB	94
4.3.4-1	Projected traffic volumes in the vicinity of the Ely, Nevada second OB	96
4.3.5-1	Projected traffic volumes in the vicinity of the Milford, Utah first OB	97
4.3.5-2	Projected traffic volumes in the vicinity of the Milford, Utah second OB	98
4.3.6-1	Projected traffic volumes in the vicinity of the Clovis, New Mexico first and second OB	100
4.3.7-1	Projected traffic volumes in the vicinity of the Dalhart, Texas second OB	101
7.1-1	Existing Railroad System, Nevada/Utah	118
7.2-1	Existing Railroad System, Texas/New Mexico	119

LIST OF TABLES

Table		Page
1-1	Operating base complex locations and components for Proposed Action and alternatives	4
1.2.4.1-1	Operation and support vehicle traffic	9
3.1-1	Locations of severe grades and alignments in the Nevada/Utah study area	20
3.1-2	Existing traffic volumes, Nevada/Utah	22
3.2-1	Existing traffic volumes, Texas/New Mexico	28
4.1-1	Intersections between proposed project roads and existing roads and railroads, Nevada/Utah	45
4.1-2	Projected peak hour traffic by construction and A&CO personnel in mountain pass segments, Nevada/Utah	46
4.2-1	Intersections between proposed project roads and existing roads and railroads, Texas/New Mexico	77

INTRODUCTION

The proposed M-X system is a large-scale defense project which will cover large portions of two states and involve almost 19,000 temporary construction workers, 5,600 temporary assembly and checkout personnel, and 13,000 permanent military and civilian employees. Approximately 9,000 mi of new roads will be constructed as part of the project, all of which will be open to the public. Two permanent operating bases will be established creating large new employment centers which will cause a large migration into the area. Among other effects, this influx of people will cause large increases in the demand for transportation facilities including roads, railroads, and airports.

PURPOSE

This report is one of a series of technical reports which serve as backup documentation to the Environmental Impact Statement for the M-X project. It examines the impacts on traffic and transportation systems associated with the construction and operation of the M-X system. The Proposed Action and eight alternative system configurations are evaluated individually and the relative impacts of each are identified.

The environmental impact analysis of this report is based upon the conceptual layouts described in Chapter 2 of the FEIS. The size and location of construction camps and other types of temporary facilities are critical elements that must be known before any detailed traffic estimates can be made. However the final siting and design of these facilities will not be completed until after the preparation of the FEIS. This report, therefore, investigates the types and relative magnitude of impacts that are likely to occur as a result of M-X. The impacts of the project are evaluated on a systemwide basis and the alternatives are compared according to their overall impacts. Detailed traffic studies will be undertaken in subsequent tiered decisionmaking processes. For a complete discussion of the tiering process refer to Chapter 1 of the FEIS.

APPROACH

This report addresses four main issues: the increase in accessibility within the region associated with construction of the project roads, the increases in traffic on existing roads associated with increases in population, the increased maintenance requirements for existing public roads due to increases in traffic, and the effect on railroad and airline service in the region. The primary emphasis of this report is on the impacts due to increases in traffic as it would be the most significant impact in the project construction area. The corresponding increases in air pollution, noise, public finance, population, and fuel consumption associated with increases in traffic are discussed in other sections of the FEIS and within ETR-10 (Noise), ETR-13 (Atmospheric Resources), ETR-24 (Energy), ETR-29 (Public Finance), and ETR-28 (Population).

The traffic analysis is based upon an estimate of the volume of traffic that will be generated by the project and an evaluation of the ability of the existing road system to accommodate it. Adverse impacts are identified as locations where congestion or other traffic problems will occur as a result of the increased traffic or where traffic increases would likely burden state and local governments with

additional maintenance costs. Potential mitigation measures are identified that could offset some of the adverse impacts of the project. These are discussed in Section 5.

The increase in traffic on existing public roads, especially truck traffic, could result in increased maintenance requirements on some segments of road. Moreover, some existing roads may have to be completely reconstructed to accommodate heavy loads. A determination of specific segments of road currently inadequate to accommodate these loadings will be identified in subsequent tiered decisionmaking and is not addressed in this report. Road segments likely to require some improvement due to increased traffic are identified, however. It would be premature to attempt more detailed studies at this time since the impacts on traffic are primarily determined by the size, location, and types of construction camps and those have not yet been determined.

Traffic within the operating bases themselves would not affect the existing road system; therefore, no attempt was made to analyze onbase traffic. Traffic movements within communities near the operating bases and construction camps were not specifically identified since growth patterns are not known, though considerable development in terms of new housing units, schools, commercial facilities, etc., will be required. Where this development will occur has not been specifically identified at this point; thus, an accurate assessment of the total magnitude and the location of traffic problems within the communities generated by the M-X project is not yet possible. However, communities are identified that will likely experience large increases in traffic, which may, in turn, cause congestion on the existing street system and the requirement for roadway improvements.

Standard traffic forecasting and capacity analysis techniques are used in this analysis. The basic principle in traffic forecasting is that the volume of traffic in a particular area is proportional to the number of people who live, work, shop or pursue other interests in the immediate vicinity. Therefore, traffic estimates can be made if the number of people that will engage in those activities is known. The M-X project will cause an increase in traffic as a result of people moving into the area to fill the jobs that will be created. A detailed description of the methodology used to estimate future traffic is contained in Section 6.

This analysis is based upon the assumption that most travel would be by personal automobile. This provides a worst-case scenario for analysis purposes. Various mitigation measures, if implemented, could substantially reduce the amount of vehicle traffic estimated under this worst-case analysis. These measures are discussed briefly throughout the text and are discussed in additional detail in Section 5.

1.0 PROJECT DESCRIPTION

The proposed M-X system would consist of two operating base complexes and the Designated Deployment Area (DDA). The first operating base would employ 7,500 military and civilian personnel and the second base would employ 5,700 personnel. The DDA would consist of 200 clusters interconnected by a road network called the Designated Transportation Network (DTN). Each cluster would contain 23 protective shelters interconnected by a cluster road. Table 1-1 is a listing of the nine alternative system layouts including the Proposed Action. These alternatives are described in more detail in Chapter 2 of the FEIS.

The M-X project would have three significant effects on the transportation system in the area in which it would be constructed: it would greatly expand the existing road system; it would cause large increases in traffic on the existing road system; and maintenance requirements would increase on existing roads as a result of the increase in traffic.

Construction and operation of the M-X system will also cause an increase in demand for railroad and airline services. The impacts of this increased demand are discussed in Section 7.

1.1 PROJECT ROADS

Up to 9,000 mi of new roads will be constructed as part of the M-X system. These roads will increase access and enhance the existing road network in the region in which the project is constructed. Moreover, the project roads will be utilized by most of the construction and operations traffic thus minimizing interference with traffic on existing public roads. All project roads would be designed to meet the operational requirements of the M-X system and will be maintained by the Air Force. Following construction, however, they would be available for use by the public, except at times when security reasons dictate temporary closures.

Some project roads may be colocated with existing roads where topography or economic considerations would make it appropriate. Any improvements to these roads required for the project would be funded by the Air Force. Maintenance responsibilities for colocated roads following construction have not been determined at this time but the Air Force would share in the cost.

The project roads will be composed of two types, the DTN and the cluster roads. Additional permanent service roads and temporary construction roads will also be constructed. The DTN will connect the Designated Assembly Area (DAA) at the first operating base with each of the clusters. It will be a 24-ft-wide paved roadway between 1,250 and 1,450 mi long, depending on the alternative configuration selected. The DTN will cross numerous existing roads but will be designed to avoid intersecting with existing roads at locations where adverse impacts on traffic flow would occur. Grade separations will be constructed at intersections of all state and federal routes, all county roads with traffic in excess of 500 vehicles per day, and all railroads.

There will also be approximately 6,200 mi of cluster roads divided among the 200 clusters. Each cluster will have approximately 31 mi of road connecting the

Table 2.2-1. OB complex locations and components for Proposed Action and alternatives.

Alternative	First OB Complex		Second OB Complex	
	Location	System Components	Location	System Components
Proposed Action	Coyote Spring Valley, Nevada	OB, DAA, OBTS, Airfield	Milford, Utah	OB, Airfield
1	Coyote Spring Valley, Nevada	OB, DAA, OBTS, Airfield	Beryl, Utah	OB, Airfield
2	Coyote Spring Valley, Nevada	OB, DAA, OBTS, Airfield	Delta, Utah	OB, Airfield
3	Beryl, Utah	OB, DAA, OBTS, Airfield	Ely, Nevada	OB, Airfield
4	Beryl, Utah	OB, DAA, OBTS, Airfield	Coyote Spring Valley, Nevada	OB, Airfield
5	Milford, Utah	OB, DAA, OBTS, Airfield	Ely, Nevada	OB, Airfield
6	Milford, Utah	OB, DAA, OBTS, Airfield	Coyote Spring Valley, Nevada	OB, Airfield
7	Clovis, New Mexico	OB, DAA, OBTS, Airfield	Dalhart, Texas	OB, Airfield
8	Coyote Spring Valley, Nevada	OB, DAA, OBTS, Airfield	Clovis, New Mexico	OB, DAA, Airfield
No Action	-	-	-	-

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cluster's 23 protective structures with the cluster maintenance facility and the DTN. These will be 27-ft-wide unpaved roads composed of stabilized base material that will be treated to control dust. The cluster roads will primarily be constructed on new right-of-way. For the Texas/New Mexico Alternative, about 20 percent of the total length will be colocated with existing roads upgraded to meet project vehicle requirements. The cluster roads will be specifically designed to avoid intersecting or colocating with any road that has average daily traffic over 250 vehicles.

The final siting of all roads, grade separations, and other facilities will not be determined until after the FEIS is completed.

1.2 TRAFFIC

The elements of the M-X system which will cause the largest impact on traffic are the traffic generators (primarily the construction camps and operating bases). The construction and operations of these elements will increase the number of jobs in the region. The increase in jobs will, in turn, cause an increase in population. This influx of people will directly cause an increase in traffic. The distribution of this traffic is dependent primarily upon the location of the employment centers and the associated residential communities. The principal traffic generators will be the construction camps during the construction phase and the operating bases during the operations phase. Additional traffic generators will be the communities near the operating bases. These communities are expected to provide housing for military and civilian employees who will not reside on the bases or in the construction camps, as well as for those persons who move into the area as a result of the M-X project but who would not be directly employed by the project. A complete discussion on population is included in the FEIS and ETR-28 (Population).

The M-X project would be divided into three phases: construction, assembly and checkout (A&CO), and operations. The construction phase extends from 1982 to 1989. A&CO includes installation of equipment and inspection of the facilities beginning in 1982 and ending in 1990. The operations phase begins in 1986 with the delivery of the first missile to its designated cluster; but the system does not become fully operational until 1990. An additional traffic impact that would occur outside the deployment area is the movement of missile components from their place of assembly to the first operating base complex. This is discussed in additional detail in Section 1.2.3.

Traffic within the DDA during the construction phase will primarily be composed of three types: construction traffic itself, commute traffic, and recreational trips of the workers living in the construction camps. Most of the construction traffice will utilize the project roadways for travel between the construction camps and the work areas. Some of the construction traffic and vehicles delivering materials and supplies will use the existing road system, as will most commute and recreation traffic.

Traffic during the operations phase will be primarily centered in and around the operating bases where the large majority of people associated with the project would live and work. Traffic will be influenced by the normal day-to-day activities of people traveling between their homes nad work, schools, shopping, etc. There

will also be some traffic associated specifically with the operation and maintenance of the M-X system but this will be very small in comparison with traffic during construction.

CONSTRUCTION (1.2.1)

DDA Construction (1.2.1.1)

During the construction of the DDA most of the traffic will center around the construction camps. This will include not only the movement of construction equipment, but also deliveries of materials and supplies, and commuting and recreation trips of the workers. Most of the construction traffic itself will remain on the project roads, principally the DTN and cluster roads, which will not affect traffic on the existing road system except at intersections where motorists will be stopped occasionally by crossing construction vehicles. However, truck deliveries and workers' commuting and recreation trips will utilize the existing road system and will affect non-M-X-related traffic.

Under the construction plan upon which this analysis is based, there will be 20 construction camps located throughout the deployment area. On the average they will be about 30 mi apart. Between 1,600 and 2,400 construction and A&CO (assembly and checkout) workers will be associated with each camp. Each will be in operation for approximately three to five years, staggered throughout the course of the project. Analysis within the FEIS assumed that half of the construction workers will reside at the self-contained construction camps and will not be accompanied by their families. The rest of the workers are expected to live in nearby communities and some will be accompanied by their familes. Traffic estimates in this report are based upon this assumption.

Peak traffic demands on the existing road network would occur during regular commute hours by construction and A&CO personnel commuting between the work areas and neighboring communities in which they are expected to reside.

Analysis of the commuting and recreation traffic assumed that half of the construction and A&CO personnel will choose to establish living quarters away from the construction camps. The majority of these trips would be made via the existing road network between the construction camps and living quarters. These trips would be made by passenger vehicles principally during a one-hour band bracketing the normal working hours. All personnel estimates upon which this study were based assumed workers would work a standard 40 hour work week, therefore most commute trips would be during normal peak hours. Should overtime be utilized to increase worker productivity then commute periods would differ but fewer workers would be required.

In addition to the daily work trips, personnel living in the construction camps are assumed to take recreation-oriented trips during the construction period. These trips would primarily be taken on weekends and would utilize the existing highway system. In general they would be trips out of the deployment area either to large cities or recreation areas or to their permanent homes. Throughout this ETR, these are referred to as recreation trips. The impacts on recreation facilities due to increases in population both temporary and permanent are discussed in the FEIS.

Construction and field work traffic would be generated at the construction camps and would travel between the camps and the locations of construction activity. This traffic would primarily be concentrated on the DTN and the cluster roads since project roads would in most cases provide the most direct connection between the individual protective structures and the camps. In some locations, some construction traffic may use existing public roads when it would shorten travel time. In addition, trucks delivering materials and supplies would use existing roads between marshalling yards and the DDA. By requiring all construction traffic and deliveries to use project roads to the maximum extent feasible, the use of existing roads could be minimized.

Operating Bases Construction (1.2.1.2)

Construction of the operating bases would be conducted in a manner similar to the DDA facilities with about half of the construction and A&CO personnel living in the construction camps and the remainder commuting from neighboring communities. Maps showing neighboring communities are included in Section 3 of this ETR. However, operations personnel would be moving into the area prior to completion of the operating bases. The combined traffic would be higher than either the peak construction-related traffic or the steady state condition associated with operation of the system.

ASSEMBLY AND CHECKOUT (1.2.2)

Approximately 1,100 round trips per week are expected between the OB/DDA complex and the DDA. This would primarily be in light vehicles but about 350 trips would be in medium or heavy vehicles. Commute and recreation trips of A&CO workers are included within the total traffic estimates presented in Chapter 4.

MOVEMENT OF MISSILE COMPONENTS (1.2.3)

The M-X missile itself will be constructed in components in four different cities and shipped to the bases either by railroad or truck. Stage one would be the largest component, weighing approximately 100,000 pounds, not including its shipping container. It would be constructed in Brighton City, Utah, and shipped via railroad. While it would be a large load requiring special security measures, it will be within the size and weight limits normally carried by railroads.

Stages two, three, and four would be constructed in Sacramento, California; Salt Lake City, Utah; and Los Angeles, California, respectively. Present plans are to ship these stages by truck. Stage two, including its shipping container, will exceed the weight limits for the state and federal highways over which it would pass, and all three stages will probably exceed the size limits depending upon the sizes of their shipping containers. Consequently, all shipments would require permits from each of the states through which they would pass.

Shipping oversize loads is common practice in all states and does not pose an unusual or adverse impact. The permitting process ensures that oversize loads are handled in a manner that does not damage the roadways, present safety problems, or disrupt the normal flow of traffic to a significant degree.

Two hundred shipments of each component will be required at the rate of approximately five per month over a period of about four years. The assembled missiles would be transported from the DAA to the clusters exclusively on the DTN which would be constructed specifically to accommodate it.

OPERATIONS (1.2.4)

DDA Operations (1.2.4.1)

Traffic within the DDA during the operations phase would be very light. Missile-carrying vehicles from the DAA would be confined to the DTN and would make only 160 trips per year. The special transporter/mobile launcher would, on the average, make 6 trips per year per cluster and will remain entirely on individual cluster roads. Table 1.2.4.1-1 is a preliminary estimate of operations traffic based upon conceptual layouts.

Operating Bases (1.2.4.2)

During the operations phase, most vehicle activity would be centered in and around the operating bases. The bases will be self-contained facilities with 80 percent of the military personnel and their dependents living on the base. Consequently, the large majority of base-generated traffic would remain on the base itself and would not utilize the adjacent road system. The traffic that would leave the base, however, would utilize existing public roads and, when combined with other traffic, may cause impacts.

A significant volume of traffic would also be generated within local communities as a direct result of the project. All civilian employees and 20 percent of the military personnel and their dependents would live in communities adjacent to, or within commuting distance, of the bases. They would generate trips to the base as well as trips internal to the specific communities in which they reside. Moreover, persons moving into the area as a result of the M-X-induced growth, who do not work on the base, would also generate trips within the communities in which they live.

The offbase housing and associated facilities are not a part of the M-X planned facilities and would likely be the product of private developers. At this stage of the planning process, it is not possible to predict the specific growth patterns and the corresponding traffic around each proposed base location. Traffic estimates were based upon "likely scenarios" of growth. In subsequent tier decision-making, more detailed estimates of growth patterns and corresponding traffic increases will be made.

Traffic assignments near the operating bases and the corresponding project effects depend upon where people live and work. The major new employment center is established by the location of the base. Where people who are not provided quarters on the base would reside is a function of a number of site-specific variables including: distance from the base to other urban areas, available transportation network, the number of people needing homes off the base, size of nearby communities, land use planning policies, likelihood of further development, attractiveness of the area, and many other factors. In order to make traffic assignments it is necessary to estimate, or make assumptions, on where people will choose to live

Table 1.2.4.1-1. Operation and support vehicle traffic[1].

Vehicle Type	Origin	Route Destination	Type of Road Utilized	Annual Trips[2] (Average Mi)	Comments
Special Transport Vehicle	OB/DAA	CMF	DTN	160 (400)	Requires 2 escort vehicles
Special Transporter/ Mobile Launcher	PS/CMF	PS/CMF	Cluster roads	1,200 (31)	
Bulldozer (Tractor and Low Bed)	ASC	Cluster barrier	DTN and/or existing roads	140-160	Barrier removal
Crew Bus (Maintenance)	ASC	Cluster	DTN and/or existing roads	1,300-2,800 (100)	Transport field maintenance crew to job
Crew Bus (40-person)	OB/DAA	ASC	DTN and/or existing roads	2,550-3,850 (400)	Five-day duty cycle at ASC
Security Crew Van (2-person)	ASC	Cluster	DTN and/or existing roads	37,230 (100)	Roving patrol replaced every 8 hours
Roving Patrol Vehicle	ASC	Cluster	DTN and/or existing roads	10,400 (200)	Patrol vehicles returned to ASC weekly for maintenance
Gasoline Tank Truck	OB/ASC	ASC	DTN and/or existing roads	TBD[3]	Consumption primarily determined by roving patrol equipment

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[1]Excludes road maintenance and administrative vehicles. This is a preliminary estimate of operations traffic based upon conceptual layouts.

[2]Total M-X basing area round trips.

[3]TBD means To Be Determined following future studies.

Source: The Boeing Co., 1980. "M-X basing area traffic analysis (study M-S B/M)," May 29.

and where development will occur. The specific project effects ar · dependent upon these assumptions.

For analysis purposes, persons were assigned to communities based upon their size and distance from the operating base. These assignments were made by a computer model which is discussed in detail in ETR-37. These assignments were made for analysis purposes only and are not meant to be a recommendation of specific growth patterns in the area. Without these assignments, however, it would be difficult to gauge the effects of the anticipated traffic on the existing road system.

The analysis examined the specific effects on a selected point in the operations phase of the project. The point selected for analysis is the year 1992 since it is the first year of steady-state operations after departure of the construction and A&CO personnel. Traffic in 1992 includes traffic increases that are anticipated through that year due to population increases not associated with M-X. This baseline traffic estimate was developed using current traffic data, evaluation of population trends in the vicinity of the bases, and by translating these trends into traffic increases. These traffic increases are added to the current traffic data to arrive at 1992 traffic estimates without M-X. Operating base traffic was then superimposed upon this projected 1992 baseline traffic to get total traffic with the M-X operation included. These data are shown on maps in Section 4.3.

2.0 SUMMARY OF IMPACTS

The transportation system within the M-X project area would be affected in three ways: accessibility within the region could be improved because of the additional roads built for the project; traffic could increase on the existing road system as a result of the influx of people into the region; and maintenance requirements on existing roads could be substantially increased.

The impact on accessibility is measured in terms of the degree of improvement of the road system in the area. The impact on traffic is measured by the increase in traffic on the road system. The impact on maintenance requirements is measured in terms of the increased costs to state and local governments to improve and maintain roads. The indirect impacts associated with increases in traffic and accessibility, such as noise, air pollution, use of recreation facilities, and disturbance of sensitive areas are discussed within the EIS and within other technical reports included within Chapter 5.

2.1 PROPOSED ACTION

DDA - ACCESSIBILITY (2.1.1)

The Proposed Action would involve construction of approximately 9,000 mi of new roads in an area of the Great Basin which presently has relatively poor access. Roads constructed for the project would be open to the public, producing a long-term change in the accessibility in the area. This expansion of the road system would increase the accessibility into and within the region which could encourage development and facilitate use of the area for recreation. This would, in turn, increase the potential for damage to sensitive resources in formerly remote areas. Without this project it is unlikely that many new roads would be constructed in the region except in the immediate vicinity of other major projects which may be constructed.

DDA - TRAFFIC (2.1.2)

The temporary influx of people into the region during the construction period would also cause a large increase in traffic within the DDA during that period. The impacts due to this increase in traffic would be greatest near construction camps and within nearby communities due to the presence of supply trucks, personnel buses, and private vehicles belonging to construction workers. While the total amount of traffic that might use the existing road network would, in most cases, not exceed its capacity, it would be substantially higher than current levels. This would cause delays and inconvenience to motorists, primarily during commute hours. In mountain passes, where capacity is severely reduced by steep grades and winding alignment, occasional congestion would likely occur due to slow moving trucks or buses or construction workers commuting from nearby communities. The impacts would be relatively short-term because each of the camps would be in use for only three to five years. Moreover, for most road segments the peak traffic would last for only one to two years.

Communities within the region, especially those near construction camps, will be affected both by traffic increases associated with temporary population increases and by traffic passing through them to other destinations such as construction camps. While this traffic would be only temporary, some street improvements such as widening or installation of traffic signals may be required at some locations in order to accommodate the traffic. The two communities likely to be affected the most are Tonopah and Ely. Until such time as the construction camp locations and schedules are established, more detailed traffic analysis of traffic impacts within communities cannot be completed. Detailed analyses will be conducted in subsequent tiered decisionmaking.

Most of the construction traffic itself would use the project roads that are specifically designed to avoid intersections with heavily or even moderately travelled roadways. At locations where project roads cross existing roads there would be occasional delays to some motorists by the crossing of construction vehicles.

During the operations phase only a small amount of traffic would use the existing roads in the DDA, consequently there will be no long-term impacts on traffic.

DDA - ROAD MAINTENANCE (2.1.3)

The anticipated increases in traffic on the existing roads, including those within communities, would likely increase the maintenance efforts needed to keep the roads in good condition, especially during the construction period when heavy supply trucks would be using some existing roads. These trucks could substantially increase the rate of deterioration of the existing roads, especially in those areas where the roads were not designed for a large number of heavy vehicles. Following the construction period, some roads might have to be repaired or reconstructed to return them to the condition they were in prior to the construction period. Additional traffic enforcement personnel may also be required. The impacts on enforcement personnel are discussed in the FEIS, Chapter 4, under Public Safety Services.

OPERATING BASES AND THEIR VICINITIES (2.1.4)

In the vicinities of the operating bases, the major impacts would be due to increases in traffic on the existing road system which would cause inconvenience and delays to motorists, increase the amount of maintenance required, and could necessitate major road improvements. Within communities near the bases, major additions to the street system would be required to accommodate the traffic associated with an increase in population and to provide access to new housing units and commercial development. Due to the increases in traffic, especially heavy vehicles, portions of existing roads in the vicinity might have to be reconstructed or improved to accommodate the heavier loads and higher volumes.

Coyote Spring (2.1.4.1)

Under the Proposed Action, the first operating base would be constructed at Coyote Spring. Once the base is operational, approximately 2,500 military and civilian personnel would be commuting to the base from neighboring communities,

primarily Las Vegas. In order to accommodate this traffic, U.S. 93, between the base and I-15, would have to be widened to four lanes. Near the operating base a segment of U.S. 93 may have to be relocated to avoid project facilities. Improvements to the U.S. 93/I-15 interchange may also be required. Traffic along State Route 7 would also increase considerably but would still not exceed the available capacity. Within the Las Vegas area and other nearby communities, such as those in Moapa Valley, improvements to the major streets may be required at some locations. This may include street widening, or reconstruction, or the installation of traffic signals, or other traffic control devices. The specific improvements that may be required depend upon where the new development actually occurs.

Milford (2.1.4.2)

Under the Proposed Action, the second operating base would be at Milford. The proposed site currently has access via unpaved roads only. Access roads to the base would have to be constructed as part of the project. If only the road to Milford were improved, four lanes would have to be constructed in order to accommodate the anticipated traffic. If the road to Minersville were also improved, traffic would be split between the two routes and two lanes would be adequate for each of the roads. This would also significantly reduce the amount of traffic that would have to pass through Milford to get to the base from other communities farther east. Improvements to existing streets would be required in Milford in either case. Some improvements may also be required in other communities, such as Minersville.

2.2 ALTERNATIVE 1

This alternative would utilize the same DDA as the Proposed Action as well as the first operating base at Coyote Spring. The second operating base would be at Beryl. In order to accommodate the anticipated traffic, the road between Beryl and Beryl Junction and State Route 56 between Beryl Junction and Cedar City would have to be improved and widened to four lanes. Other minor improvements might also be required but, in general, the existing road system near the base would accommodate the anticipated traffic. Within the nearby communities, primarily Newcastle, Enterprise, and Cedar City, some improvements would be required on major streets in order to accommodate the anticipated traffic.

2.3 ALTERNATIVE 2

The overall impacts for this alternative would be the same as for the Proposed Action except for the second operating base, which would be at Delta instead of Milford. Due to the anticipated increase in traffic, U.S. 50 between the proposed site and Delta would have to be widened to four lanes, but other roads in the vicinity should adequately accommodate the anticipated traffic although the volumes would increase substantially. Since most of the offbase development would be expected to occur within or near Delta, improvements to the major streets may be required at some locations.

Because the proposed site is near a construction camp location, the short-term cumulative impacts during the construction period would be greater than those associated with construction of the second operating base under the Proposed Action.

2.4 ALTERNATIVE 3

This alternative utilizes the same DDA as the Proposed Action but the operating base locations are different. The first operating base would be near Beryl and the second operating base near Ely.

The impacts within the DDA would be similar to the Proposed Action, but the construction scheduling would be different. The impacts near the Beryl base site would occur earlier than under the Proposed Action, but would be of the same magnitude. Similarly, impacts to roads in and near Dry Lake Valley would occur later.

Near Beryl, the traffic impacts would be similar to those discussed for Alternative 1, but since it would be the first operating base in this case, traffic volumes would be about 20 percent higher.

Near Ely, the increase in traffic along U.S. 6-50-93, between the proposed site and Ely, may require widening the road to four lanes. Most of the other roads in the vicinity would also experience increases in traffic but should be able to accommodate the traffic without congestion. Within Ely itself, the anticipated traffic, especially along U.S. 50, would approach the capacity of the existing road system, making improvements necessary to avoid congestion during peak periods.

As in the case of Delta, Ely would have short-term traffic impacts associated with concurrent construction at the DDA and the operating base.

2.5 ALTERNATIVE 4

The impacts would be similar to those identified for Alternative 3. The only difference is that Beryl would be the first operating base in this case and therefore projected traffic levels will be about 20 percent higher (as in Alternative 3); Coyote Spring Valley would be the second operating base and therefore projected traffic levels would be about 20 percent less.

2.6 ALTERNATIVE 5

The impacts within the DDA would be comparable to Alternative 3. Milford, however, would be the first operating base in this alternative, consequently, projected traffic levels would be about 20 percent higher than for the Proposed Action. The second operating base would be at Ely and the impacts would be the same as discussed for Alternative 3.

2.7 ALTERNATIVE 6

The impacts within the DDA would be the same as for Alternative 3. The impacts near the bases would be similar to the Proposed Action except that the location of the first and second operating bases would be reversed. Projected traffic levels would be about 20 percent higher near Milford (as in Alternative 5) and about 20 percent lower near Coyote Spring Valley (as in Alternative 4).

2.8 ALTERNATIVE 7

The same types of impacts on accessibility, traffic, and road maintenance that are anticipated for the Proposed Action in Nevada/Utah would occur for this alternative in Texas/New Mexico but not necessarily to the same degree. (Refer to the discussion for the Proposed Action.) Within the DDA the existing road network is already extensive and accessibility is good to most areas. Therefore the increase in accessibility and the corresponding indirect impacts would be substantially less than in Nevada/Utah. There are few areas in this region that are not already accessible so that the addition of the project roads would not be as likely to encourage more travel or more development as it would in Nevada/Utah.

In general, traffic increases within the DDA would not exceed the capacity of the road system primarily because of the relatively low volume of traffic currently using the roads and because construction activity would be spread over a wide area. Because there are more existing roads as well as more communities in which construction workers could live, the concentration of traffic would be much less than in Nevada/Utah. Some inconvenience and delay may occur near the construction camps and within some of the small communities in the area. Nevertheless, the amount of inconvenience and delay would be of relatively short duration. The traffic associated with construction may increase the amount of maintenance required on the existing roads.

The anticipated project-related traffic in some of the communities within the DDA may overload their existing street systems during the time when nearby construction camps are operating. Some road improvements and increased maintenance efforts may be necessary to accommodate traffic. Until such time as the construction camp locations and schedules are established, more detailed analysis of traffic impacts within communities cannot be completed. Detailed analyses will be conducted in subsequent tiered decisionmaking studies.

The first operating base site near Clovis would be an expansion of an existing facility, Cannon AFB, with traffic patterns in the vicinity remaining basically the same. There would, however, be an increase in volume. Some congestion may result along U.S. 60 unless improvements are made, especially at some of the critical intersections. There may be some localized traffic problems within Clovis itself during peak periods when traffic destined for the base will concentrate on approaches to U.S. 60. In order to relieve traffic along U.S. 60 near the base, it may be desirable to improve access directly from State Route 467.

In the vicinity of the second operating base near Dalhart, the increase in traffic could result in some problems in the nearby communities. Dalhart, Dumas, and Hartley could be adversely affected by traffic traveling in or through them. All three of the communities could experience localized traffic problems at one or more locations along their main streets depending upon where new housing units or associated commercial establishments are constructed.

2.9 ALTERNATIVE 8

This alternative involves placing half of the system in Nevada/Utah and half in Texas/New Mexico with one operating base in each area. Consequently, the impacts

in each area would be less extensive than in the Proposed Action or in Alternatives 1 through 7, although the concentrations of impact around the project facilities would be similar. (Refer to the discussion for the Proposed Action.)

Only half as many roads would be constructed in each region, resulting in the increase in accessibility being proportionately less than that discussed for the Proposed Action and Alternative 7. The impacts on traffic near the construction camps would be similar to the full basing alternatives but only about half as many camps would be required in each region.

The impacts on traffic near the Coyote Spring Valley operating base site would be similar to those discussed for the Proposed Action and the impacts near the Clovis operating base site would be similar to those discussed for Alternative 7. However, since Clovis would be a second operating base in this case, projected traffic levels would be about 20 percent less.

3.0 BASELINE ENVIRONMENT

The existing transportation network in each of the study areas is described in this section. Existing road systems and traffic volumes in the Nevada/Utah and Texas/New Mexico regions are discussed. Also noted are communities within the study area that would likely experience increases in traffic due to the M-X project. In addition, an evaluation is made of the abilities of the road systems to accommodate anticipated increases in traffic due to population increases resulting from growth other than that due to the M-X project.

Baseline data on railroads and airport facilities are presented in Section 7 of this ETR.

3.1 NEVADA/UTAH DEPLOYMENT AREA

The existing road system in the Nevada/Utah region comprises a network of federal, state and county highways. As shown in Figure 3.1-1, the immediate area is served by U.S. Highways 6, 50, and 93. Although not directly in the proposed deployment area, Interstate Routes 70, 80, and 15 provide an important means of access to the area. State highway segments include Utah routes 21, 56, 130, and 257 and Nevada routes 2, 7, 25, 8A, 21, 38, 46, and 51.

The highways are primarily two-lane, paved roads. The exceptions are the interstate routes, which are four-lane, divided roadways, and Nevada routes 21 and 46, which are unpaved.

These roads vary from relatively straight and level segments to segments with sharp curves and steep grades dictated by topography. Fourteen locations with winding alignments and grades in excess of four percent have been identified and are shown on Figure 3.1-2. These locations are confined to mountain passes and are listed in Table 3.1-1 along with an indication of the length of the section, the maximum grade, and the horizontal alignment severity. As is indicated in the table, the majority of these segments are located along U.S. 50 between Austin, Nevada and Delta, Utah.

In general, the existing highways have sufficient capacity to accommodate current traffic volumes along with some excess capacity to allow for increases in traffic. While these roads adequately accommodate current traffic, most were not designed for a large number of heavy vehicles. A large increase in heavy vehicle traffic would probably result in a more rapid deterioration of the roads than would otherwise occur. This is emphasized in a comment from the Governor of Nevada: "Although existing roads are generally in fair condition, most of them are subjected to only very light traffic volumes and have already exceeded their design life. When increased traffic volumes and increased loads are imposed on these roads, they will quickly break up and will require immediate reconstruction, resurfacing, and possibly widening." (B0164-2-041). Impacts are addressed in Section 4 of this ETR.

Current traffic volumes are shown for representative highway segments in Figure 3.1-3 and Table 3.1-2. On I-15 current traffic volumes vary from 4,300 to 6,800 vehicles per day (vpd) and on I-80, from 2,800 to nearly 4,000 vehicles per day.

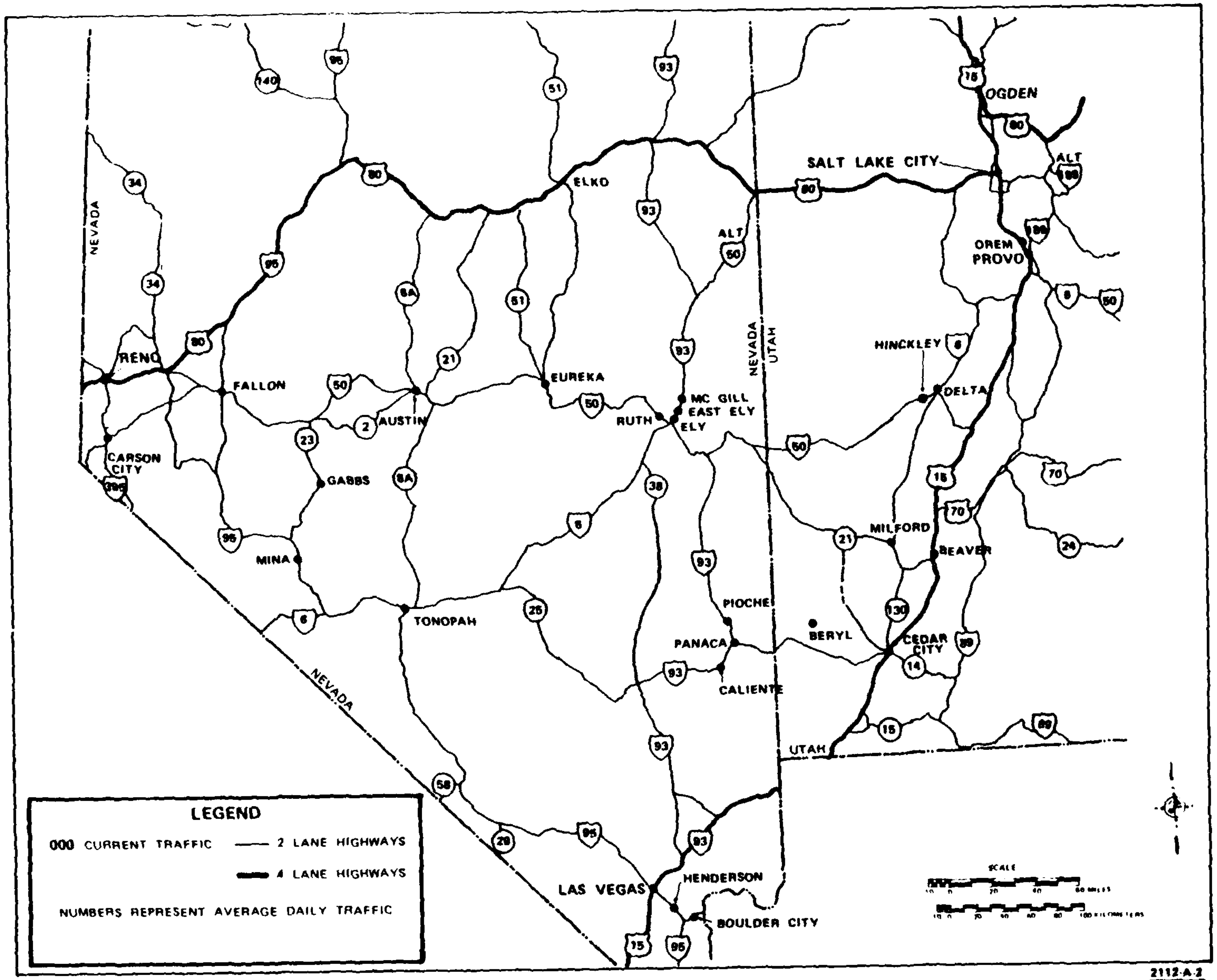

Figure 3.1-1. Existing road system, Nevada/Utah.

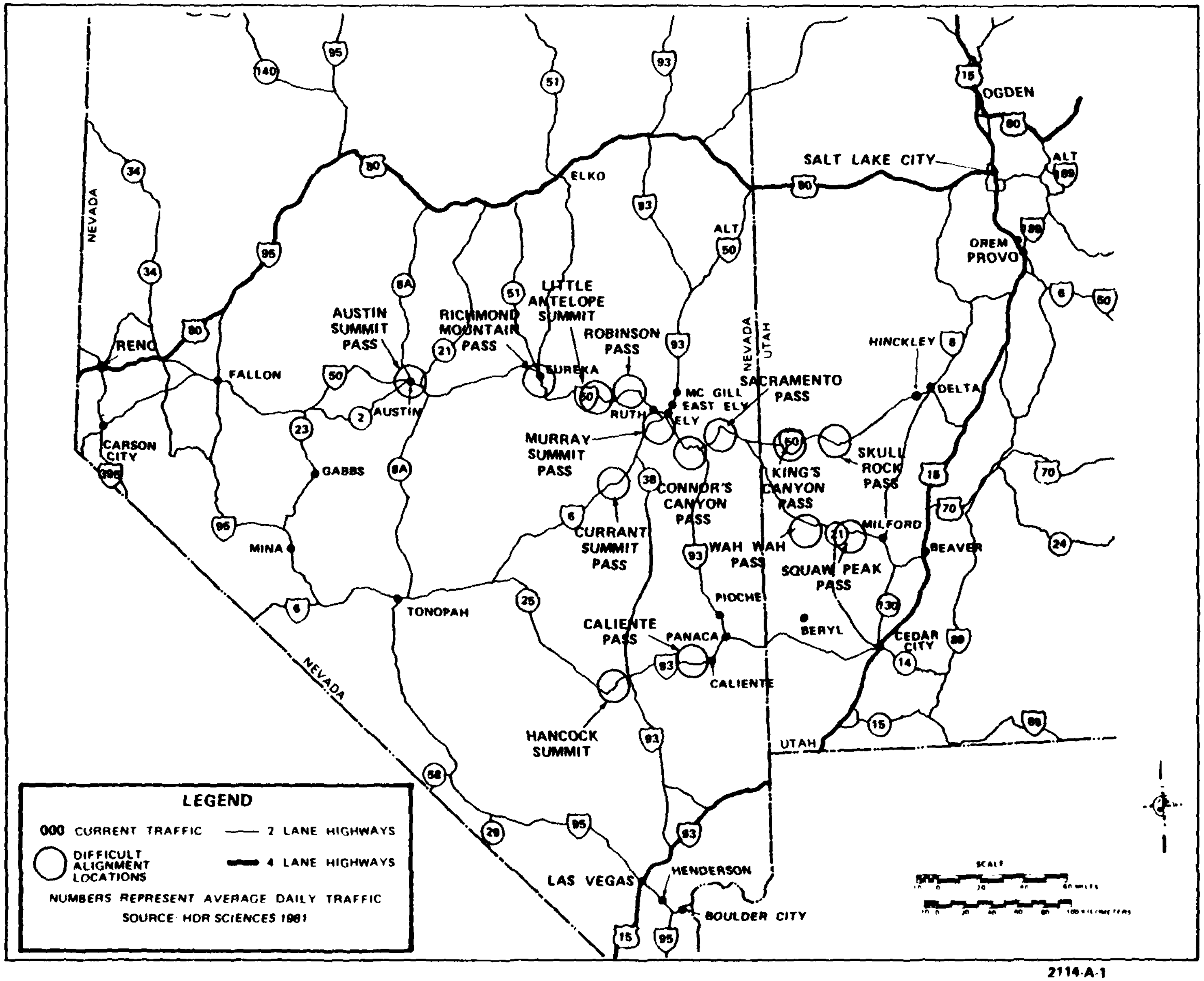

Figure 3.1-2. Difficult alignment locations, Nevada/Utah highways.

Table 3.1-1. Locations of severe grades and alignments in the Nevada/Utah study area.

Pass	Location	Route	Percent of Maximum Grade	Length (Mi)	Alignment	Theoretical Capacity (Veh/Hr)
Skull Rock	45 mi SW of Delta	U.S. 6 & 50	6.5+	1-1.5	Fair	220
Kings Canyon	55 mi SW of Delta	U.S. 6 & 50	5-7	7.5-8	Moderate to Poor	220
Sacramento	41-56 mi East of Ely	U.S. 6 & 50	5-7	3.5	Moderate	200
Conners Canyon	18-27 mi East of Ely	U.S. 6 & 93	5-8	8.3	Moderate	330
Robinson	16-23 mi West of Ely	U.S. 50	3-4	7	Moderate	450
Little Antelope Summit	31-40 mi West of Ely	U.S. 50	4	9	Moderate to Poor	450
Richmond Mountain	Eureka to 13 mi East of Eureka	U.S. 50	4+	13	Moderate	420
Austin Summit	Austin to 12 mi East of Austin	U.S. 50	6-7	12	Poor	250
Squaw Peak	15-18 mi West of Milford	Utah 21	6+	0.5	Moderate	760
Wah Wah	30-35 mi West of Milford	Utah 21	7-7.5	1.5	Good	630
Caliente	Caliente to 15 mi West of Caliente	U.S. 93	6-7.5	1.5	Moderate	480
Hancock Summit	12 mi West of Crystal Springs	Nevada 25	6-7	2	Fair to Moderate	470
Currant Summit	5-15 mi NE of Currant Ranch	U.S. 6	6-7	1	Fair	200
Murray Summit	1-10 mi SW of Ely	U.S. 6	6	1	Poor	280

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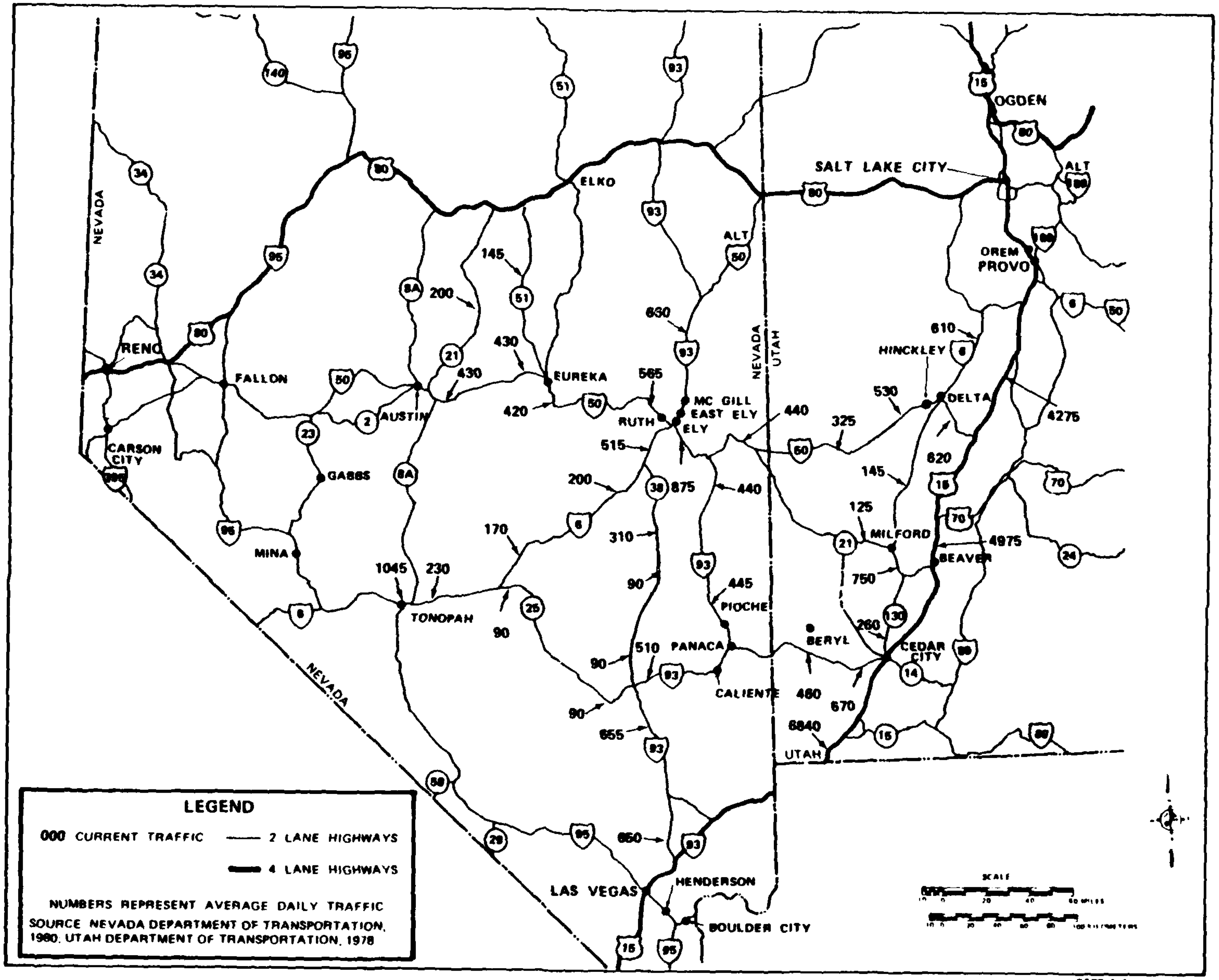

Figure 3.1-3. Existing traffic volumes, Nevada/Utah.

Table 3.1-2. Existing traffic volumes - Nevada/Utah.

State	Route	Segment	Average Daily Traffic (Vehicle/Day)
Nevada	I-80	U.S. 93 Junction to S 233 Junction	2,800
		East of U.S. 95 Junction	3,900
	U.S. 50	Utah Border to Fallon	540
	U.S. 6	Ely to Tonopah	350
	U.S. 93	I-15 Junction to Alternate 93 Junction	500
	U.S. 95	Las Vegas to U.S. 6 Junction	970
	S 7	U.S. 93 Junction to I-15 Junction	60
	S 8A	S 376 to I-80 Junction	200
	S 21	U.S. 50 Junction to I-80	5
	S 23	U.S. 95 Junction to U.S. 50 Junction	200
	S 25	Utah Border to U.S. 6 Junction	150
	S 38	South of U.S. 6 Junction	200
	S 46	U.S. 50 Junction to I-80	6
	S 51	U.S. 50 Junction to I-80	150
Utah	I-15	South of Cedar City	6,800
		Beaver to I-70 Junction	5,000
		U.S. 50 Junction to U.S. 6 Junction	4,300
	I-70	East of U.S. 89 Junction	2,500
	I-80	West of Salt Lake City	3,900
	U.S. 6	Eureka to Delta	600
		West of Delta	300
	S 21	West of Milford	100
	S 56	Modena to East of Newcastle	600

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Source: Nevada Department of Transportation, 1980; Utah Department of Transportation, 1978.

Other routes carry noticeably less traffic. Many of the U.S. routes have light traffic ranging from less than 250 vehicles per day on a segment of U.S. 6 near Tonopah to slightly over 1,000 vehicles per day on a portion of U.S. 95 in southern Nevada. Current traffic volumes on state highways in this region range from less than 10 vehicles per day on Nevada routes 21 and 38 to approximately 600 vehicles per day on a segment of Utah Route 56.

The capacity of most sections of two-lane highways in the study area is relatively high with the ability to accommodate 7,000 to 10,000 vehicles per day. These calculations were arrived at through capacity analysis with assumptions for the number of trucks in the traffic stream and certain peaking characteristics (Nevada Department of Transportation, 1979; Highway Capacity Manual, 1965).

In certain areas of the study region, particularly the mountain passes identified earlier, highway alignment is severely influenced by the topography, thereby limiting available capacity. In these cases, traffic operates at reduced levels of service, characterized by slow speeds and reduced passing opportunities. When coupled with relatively high levels of traffic delay and congestion occasionally result, primarily behind slow moving vehicles. The estimated theoretical capacities of these highway sections are shown in Table 3.1-1. These theoretical capacities reflect the effect of steep grades and winding alignment which reduce highway speed and correspondingly affect capacity (Highway Capacity Manual, 1965). In general, most can accommodate the existing traffic, although future traffic increases may result in some congestion.

There are a number of small communities within the proposed deployment area. Those with populations over 500 are shown in Figure 3.1-4. Most of these communities are located on federal and state routes.

Of the communities identified, traffic data were available for Ely, Eureka, Caliente, Pioche, and Tonopah, and are shown in Figure 3.1-5. The figures show that existing traffic through Eureka on U.S. 50 ranges from 1,000 to 1,500 vehicles per day, while in the Caliente-Pioche area, traffic on U.S. 93 varies from approximately 300 to 2,100 vehicles per day.

In Tonopah, a volume of over 7,000 vehicles per day was recorded on U.S. 6-95 near the center of town and in Ely the volumes on U.S. 50 are 9,000 to 10,000 vehicles per day. The highways through these communities are two-lane roadways with approximate capacities of 10,000 vehicles per day. Under current traffic loads, only Tonopah and Ely are near capacity.

In communities indicated on Figure 3.1-4 where traffic data were not readily available, examination of traffic data on nearby highway segments indicates the low likelihood of existing traffic problems.

In general, traffic data on the Nevada/Utah highway network and on streets within local communities indicate extremely light traffic for existing conditions. Only infrequent congestion is expected to be found on most highways or within communities. However, certain highway segments with steep grades and sharp curves now function near capacity at times because of low operating speeds and reduced passing opportunities.

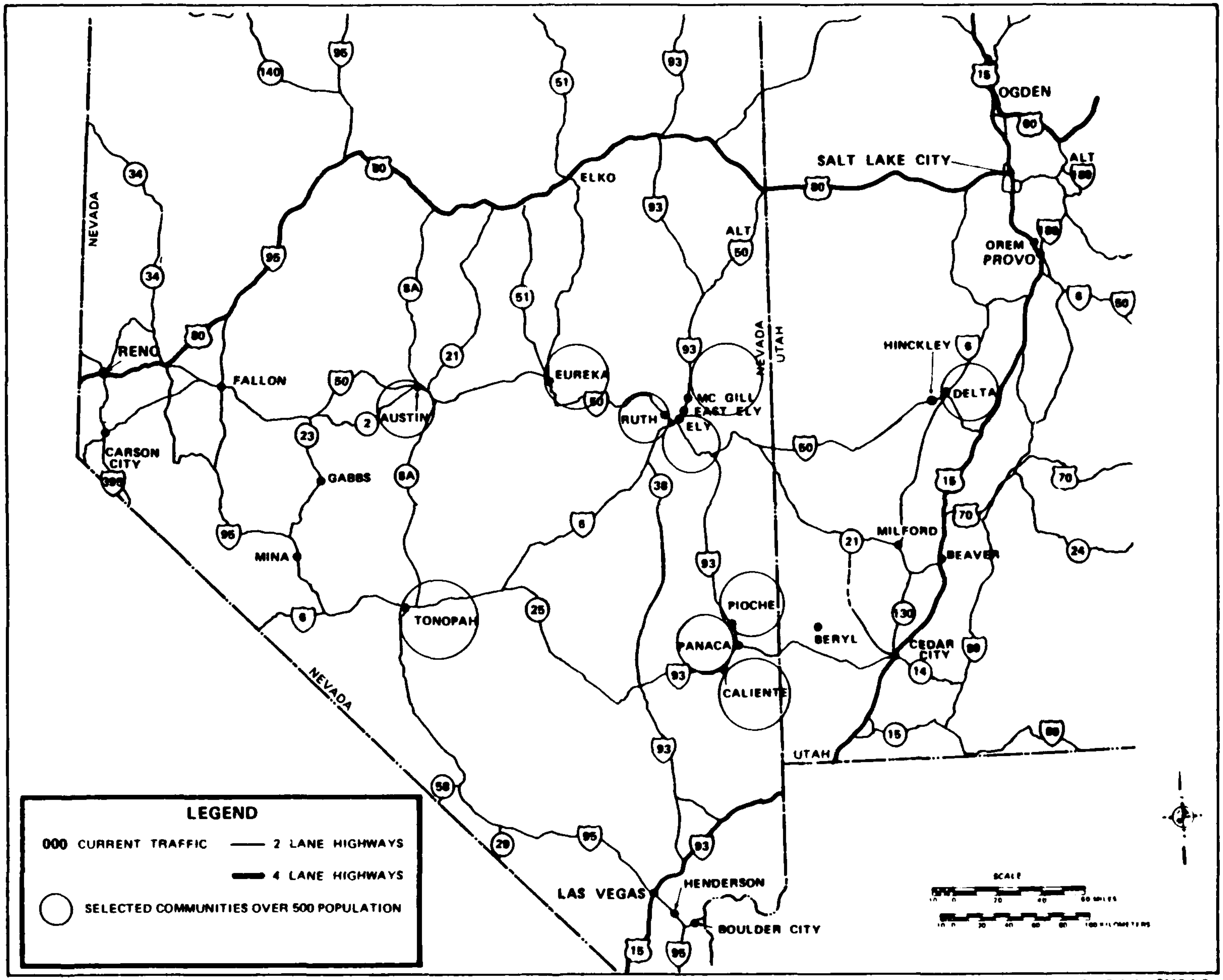

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Figure 3.1-4. Communities with over 500 population, Nevada/Utah.

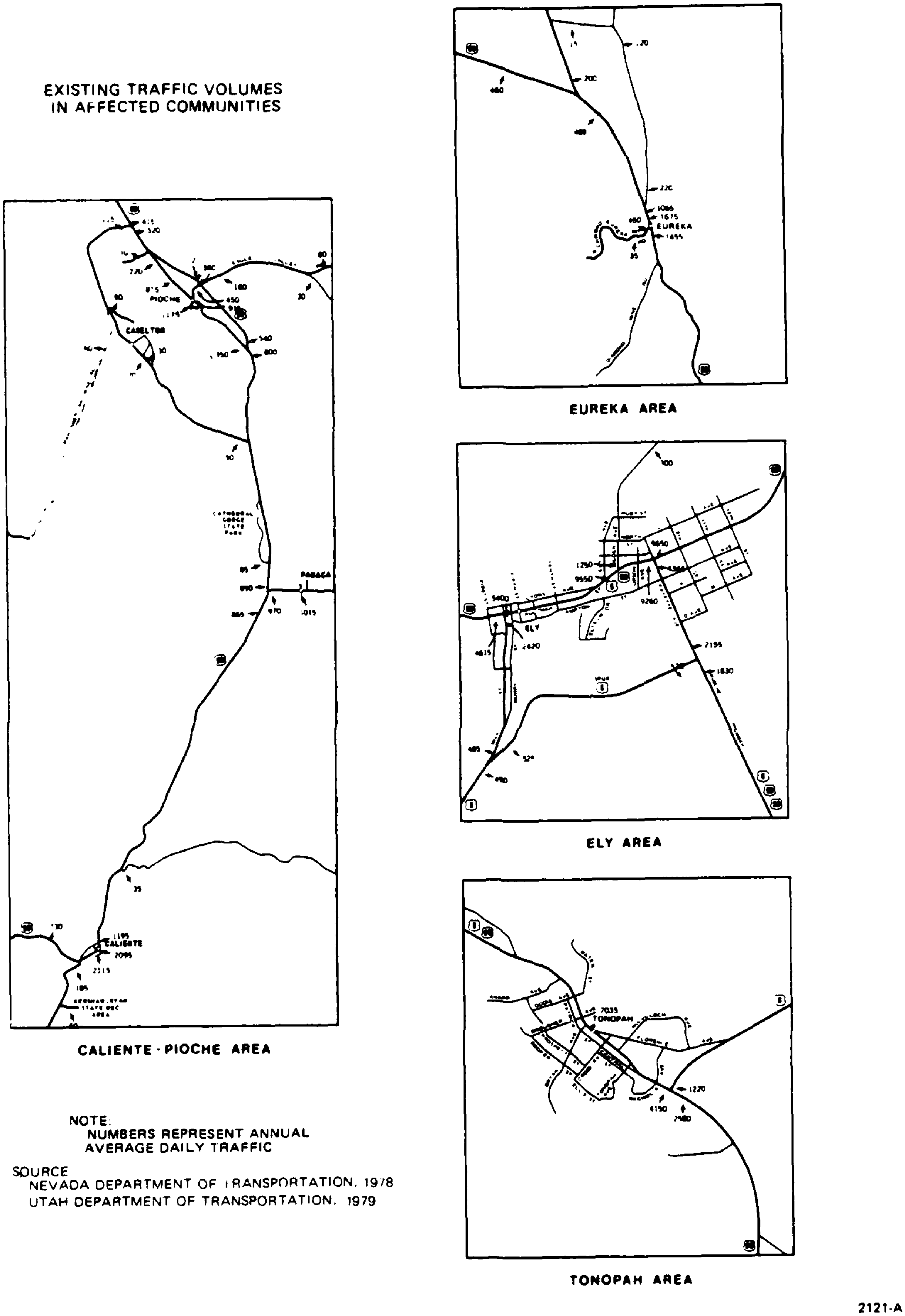


Figure 3.1-5. Existing traffic volumes for Ely, Eureka, Caliente, Pioche, and Tonopah, Nevada.

Population within the proposed deployment area is expected to increase by 35 to 53 percent by 1992 without the M-X project depending upon the size and amount of other major projects proposed for the area. Except for the vicinity of large new projects, the increases in traffic associated with the population increases without M-X should easily be accommodated by the existing road system.

3.2 TEXAS/NEW MEXICO DEPLOYMENT AREA

The Texas/New Mexico region is served by an extensive road network consisting of federal and state highways and a highly defined grid of section-line county roads. The federal and state highway system is shown on Figure 3.2-1. East-west routes consist of I-40, I-25, U.S. 180, U.S. 82, U.S. 380, U.S. 60, U.S. 56, and U.S. 70. Service in a north-south direction is provided by U.S. 285, U.S. 287, U.S. 84, I-27-U.S. 87, and U.S. 385. State routes which cross a significant portion of the region are New Mexico routes 18, 39, 104, and 120.

As in Nevada/Utah, much of the highway network is composed of two-lane roadways; however, a substantial part of the system is four-lane roadway. The four-lane network consists primarily of I-40 and I-27 (U.S. 87) and segments of U.S. 70, U.S. 60, U.S. 287, U.S. 62, U.S. 84, and New Mexico 18.

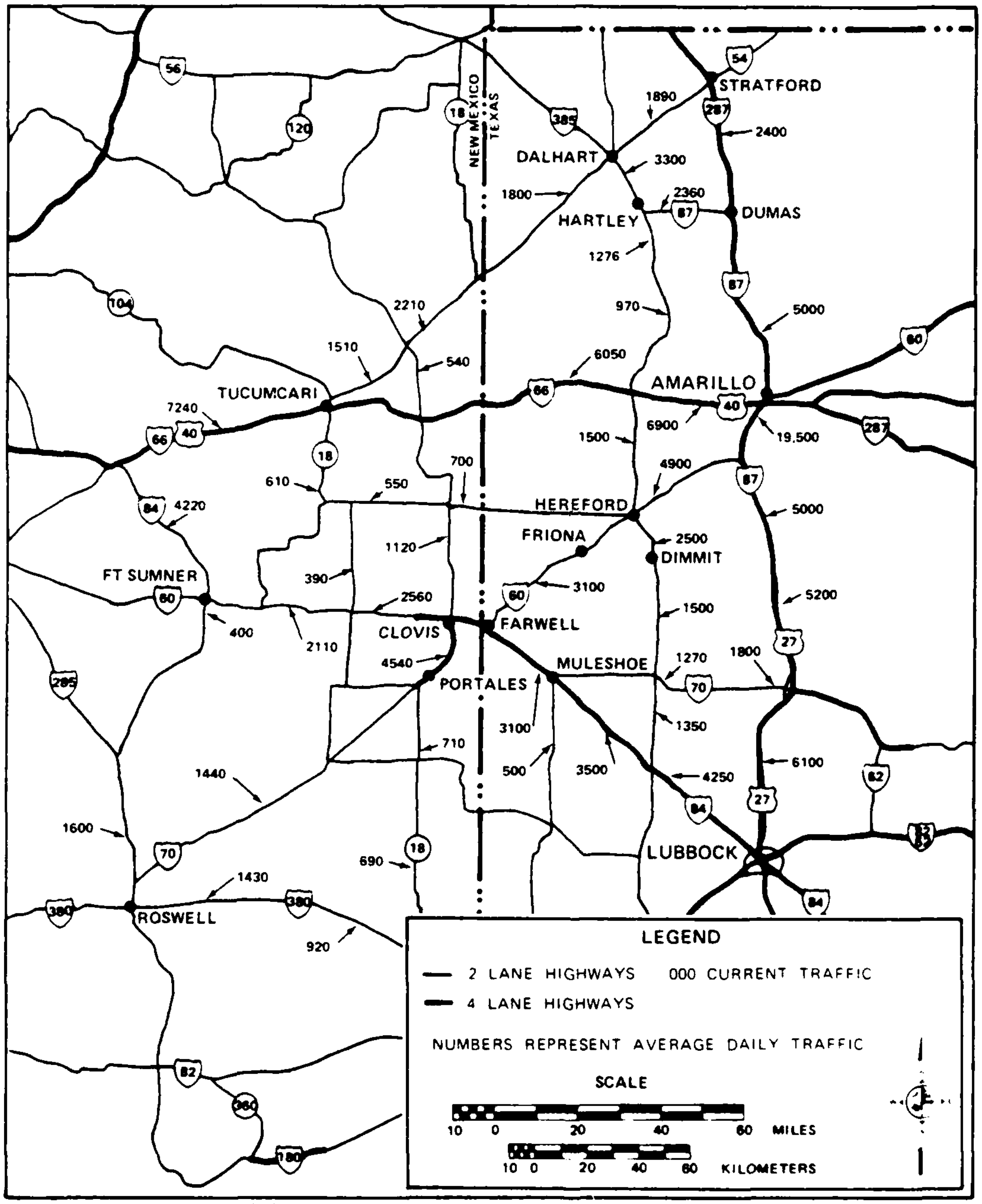
Unlike Nevada/Utah, the Texas/New Mexico region has few major topographic constraints to influence road alignment, and consequently the capacities of most highway segments in the region are generally unaffected by topography.

The roads in this area are generally in good condition and provide a good level of service for current traffic. However, because they were designed for relatively low volumes, it is questionable whether they could handle a large increase in heavy vehicles. This point is reflected in a comment on the DEIS by the Eastern Plains Council of Governments, "All other roads in the Eastern Plains (other than I-40 and U.S.70) are two-lane and relatively substandard for heavy vehicles traffic." Their comments also cite two examples where the influx of heavy trucks has significantly damaged what are otherwise good roads, "An example is State Road 39 between San Jon and Logan which has drastically deteriorated due to the traveling gravel trucks which were used for the I-40 development. In addition, roads in Harding and Union counties are continuing to deteriorate, due to heavy vehicles used for CO_2 development."

Traffic data, obtained from the Texas Department of Highways and Public Transportation and from the New Mexico Highway Department for highways within the region, are shown in Figure 3.2-1 and summarized in Table 3.2-1. Traffic in this region is substantially higher than in Nevada/Utah. Average volumes on federal routes throughout the region vary from 560 to over 8,000 vehicles per day, and on state highways from 200 to 1,000 vehicles per day.

Analysis of highway sections shown on Figure 3.2-1 in order to determine existing problem areas indicates that the current traffic volumes are well within the capacity range of the existing roadway sections.

Selected Texas/New Mexico communities of over 1,000 population which lie in the M-X deployment area are shown in Figure 3.2-2. These communities are located on federal and state highways that cross the area. It should be noted that other communities within the area will also be affected, but the selected



SOURCE TEXAS STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION, 1978. NEW MEXICO STATE HIGHWAY DEPARTMENT, 1980

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Figure 3.2-1. Existing road system and traffic volumes, Texas/New Mexico.

Table 3.2-1. Existing traffic volumes - Texas/New Mexico.

Route	Segment	Average Daily Traffic (Vehicle/Day)
I-25	Raton to Las Vegas	2,400
I-40	Amarillo to Tucumcari	6,600
	West of Tucumcari	7,600
U.S. 180	Hobbs to Carlsbad	2,500
U.S. 82	West of Artesia to New Mexico 18 Junction	1,400
U.S. 380	West of Roswell to Texas Border	1,500
U.S. 60	Ft. Sumner to U.S. 385 Junction	2,600
	Hereford to Canyon	5,000
U.S. 56	I-25 Junction to Hereford	560
U.S. 70	Muleshoe to Plainview	1,700
	Clovis to Portales	4,400
	New Mexico 18 Junction to U.S. 380 Junction	2,100
U.S. 84	Clovis to Lubbock	3,400
	Ft. Sumner to Santa Rosa	2,800
I-27-U.S. 87	Canyon to Plainview	5,100
	Plainview to Lubbock	6,400
U.S. 285	Roswell to Vaughn	1,300
	Carlsbad to Roswell	2,600
U.S. 287	North of Dumas	2,400
U.S. 385	North of Dalhart	2,000
	Dalhart to Hartley	3,300
	Hartley to I-40 Junction	1,100
	I-40 Junction to Littlefield	2,600
U.S. 54	Tucumcari to North of Stratford	1,800
NM 18	North of I-40	200
	I-40 to U.S. 380 Junction	800
	U.S. 380 Junction to Lovington	200
NM 39	U.S. 54 Junction to U.S. 56 Junction	300
NM 104	West of Tucumcari	300
NM 120	I-25 to U.S. 56 Junction	200

T2653/8-8-81

Source: New Mexico Highway Department and Texas Highway Department.

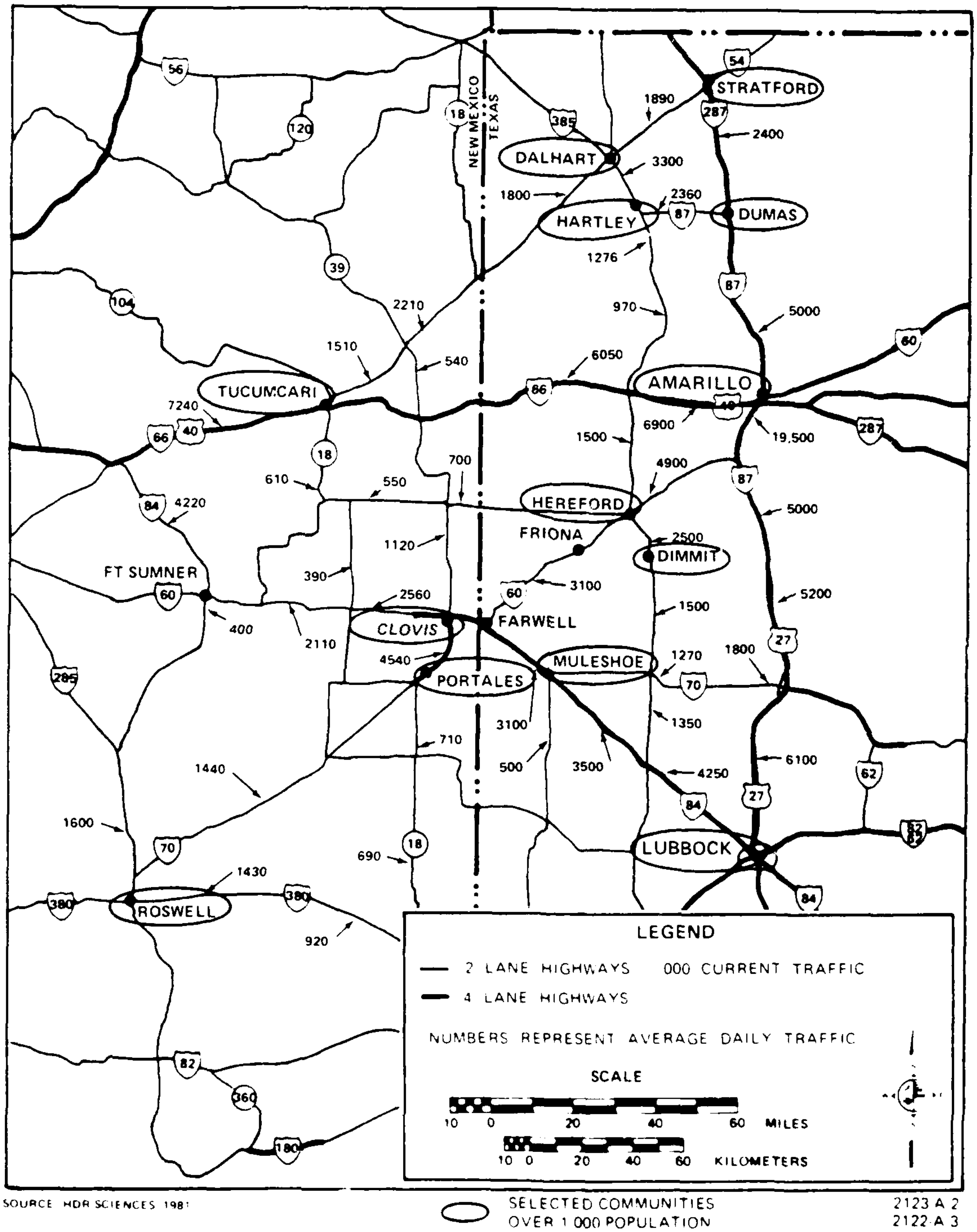


Figure 3.2-2. Selected communities of over 1,000 population, Texas/New Mexico.

communities were chosen as representative of locations where traffic impacts would be most evident.

In addition to Clovis and Dalhart, which are located near potential M-X operating base sites, the communities of Stratford, Hartley, Hereford, Dimmitt, Friona, Farwell, and Muleshoe in Texas, and Portales in New Mexico are located on major highways which directly serve the deployment area.

Current traffic data were available for only Dalhart, Hartley, Hereford, and Dimmitt among the communities within the study area. These data are shown on Figures 3.2-3 and 3.2-4. Existing traffic volumes along U.S. 87 and along U.S. 54 in Dalhart range from 3,000 to 4,300 vehicles per day. These volumes are well within the capacity of the existing roadways. In Hartley, U.S. 87-385 carries 1,200 to 4,000 vehicles per day which is also easily serviced by the existing two-lane road.

Traffic volume on U.S. 385 through Dimmitt is significantly higher at 7,000 to 9,000 vehicles per day, which is near the capacity of the existing roadway. Hereford is serviced by a four-lane section of U.S. 60, which carries 5,000 to 9,000 vehicles per day. Even though traffic volumes within other communities in the area were not available, traffic data on highway segments near the remaining communities indicate no apparent capacity problems within those communities.

In general, the Texas/New Mexico road system has sufficient capacity to accommodate present traffic levels. Moderate increases in traffic can be accommodated without roadway improvements in most of the areas studied. However, most roads could probably not accommodate a large increase in heavy vehicle traffic without increasing their rate of deterioration.

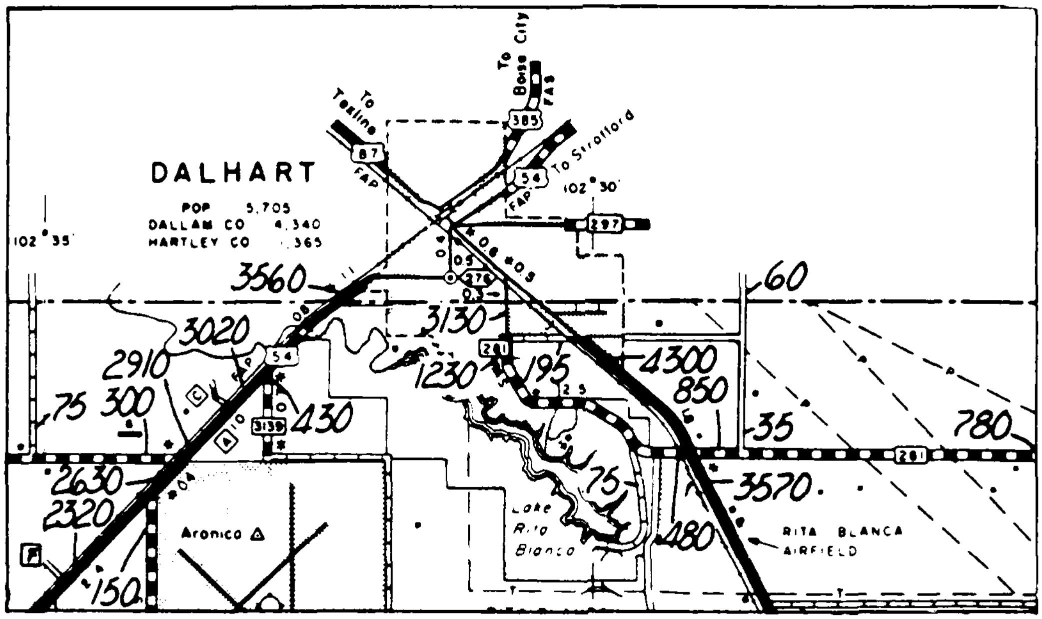
3.3 PROPOSED OPERATING BASE LOCATIONS

BERYL, UTAH (3.3.1)

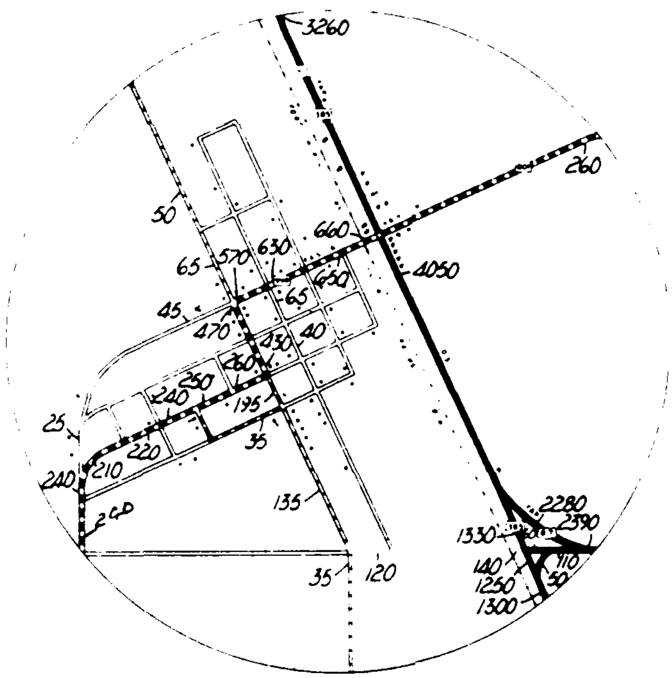
The proposed base site at Beryl is in an undeveloped area in southern Utah. Primary access is via a 12 mi long paved road, which runs north from Beryl Junction, which is located at the intersection of this road and State Highway 56. An unpaved road also passes through the area connecting Milford, approximately 50 mi to the northeast of Beryl, with Modena, 15 mi to the southeast of Beryl. A schematic map of the road network and neighboring communities in the vicinity is shown in Figure 3.3.1-1.

The existing road between Beryl and Beryl Junction is a very low volume county road. No current traffic data were available. State Highway 56 is a good quality two-lane road with average daily traffic of 500 near Beryl Junction. The community of Cedar City is 43 mi to the east along this route. State Highway 18 is a good quality two-lane road, which passes through the community of St. George 60 mi to the south.

There are two small rural towns near Beryl Junction, Newcastle, and Enterprise, which lie on State Highway 56 and 18, respectively. There are also a number of small communities west of the proposed site along State Highway 56 that may attract some base employees. These include Pioche, Panaca, and Caliente. No major increases in traffic are anticipated in this vicinity without the M-X project.



DALHART



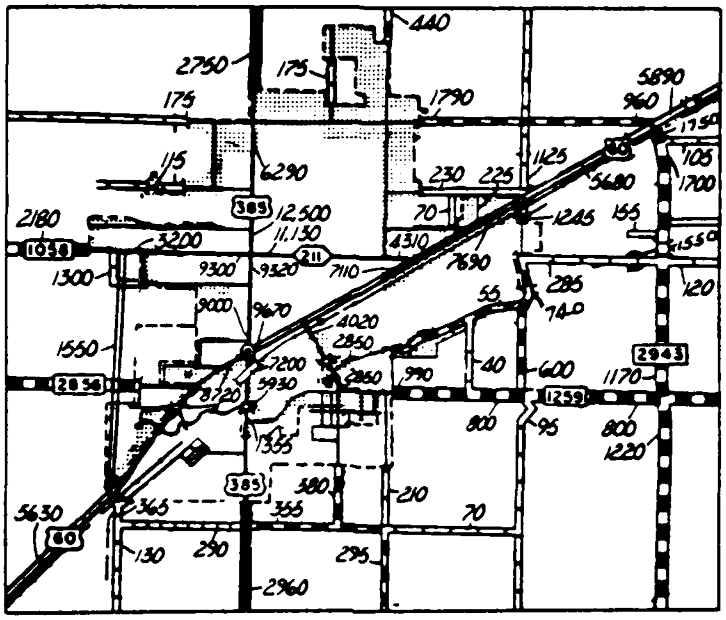
HARTLEY

NOTE:
NUMBERS REPRESENT ANNUAL AVERAGE DAILY TRAFFIC

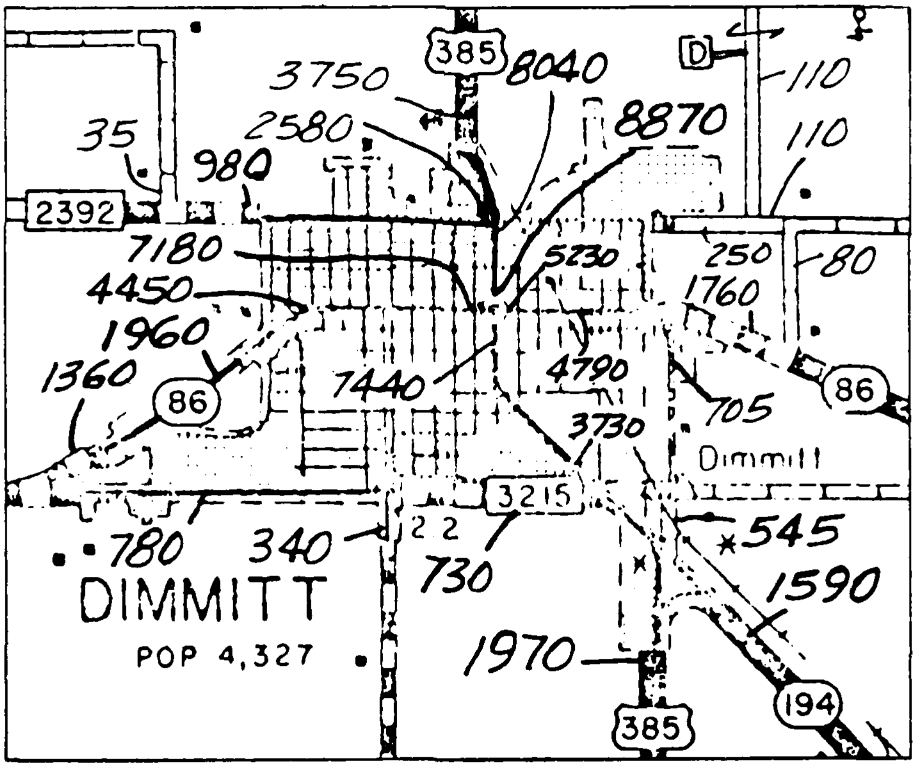
SOURCE:
TEXAS STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION, 1975

2125-A

Figure 3.2-3. Existing traffic volumes for Dalhart and Hartley, Texas.



HEREFORD



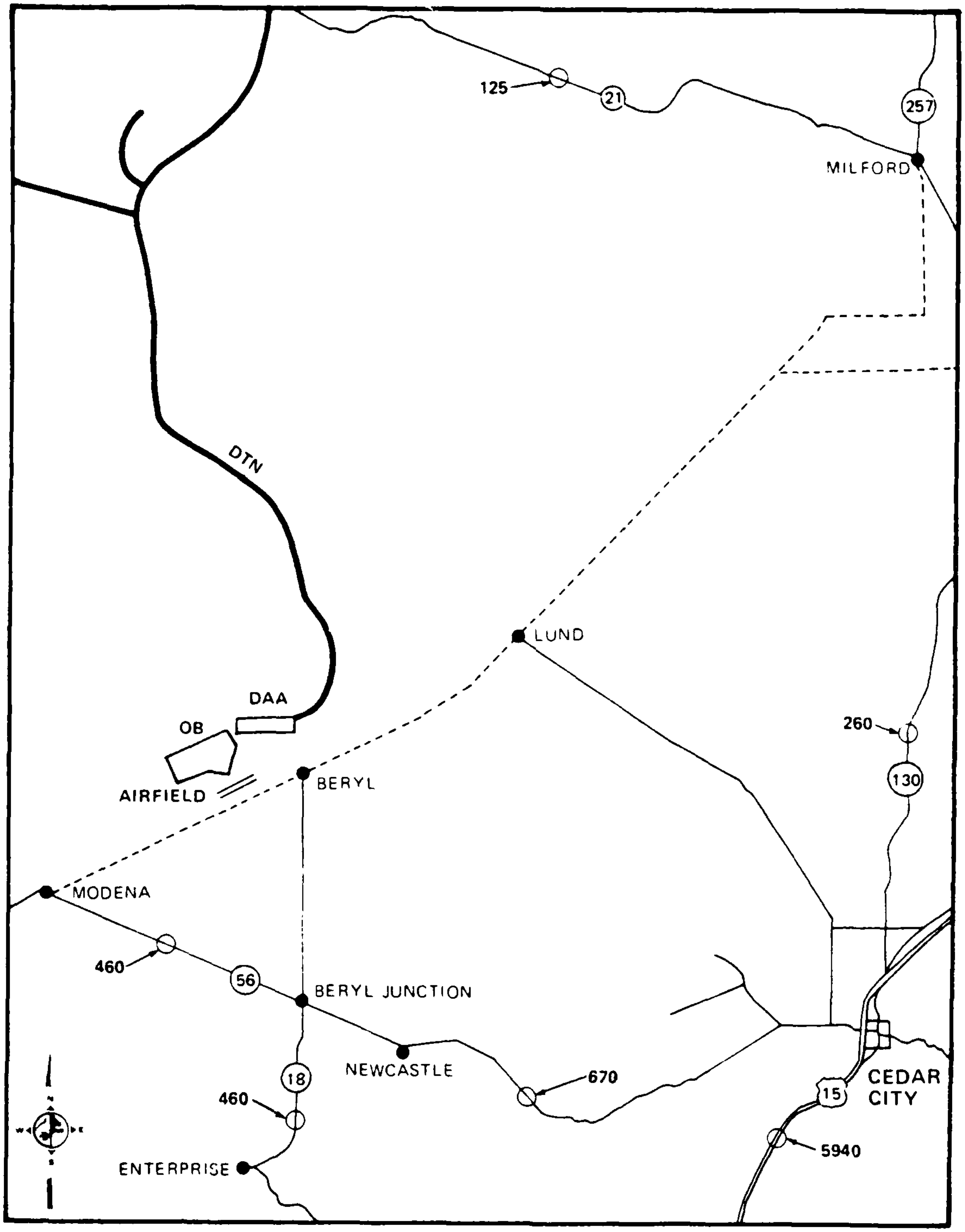
DIMMITT

NOTE:
NUMBERS REPRESENT ANNUAL AVERAGE DAILY TRAFFIC

SOURCE:
TEXAS STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION, 1975

2124-A-1

Figure 3.2-4. Existing traffic volumes for Hereford and Dimmitt, Texas.



LEGEND 000 - 1978 TRAFFIC VOLUMES, BERYL, UTAH

SOURCE: UTAH DEPARTMENT OF TRANSPORTATION

Figure 3.3.1-1. Existing road network and traffic volumes in the vicinity of Beryl, Utah.

COYOTE SPRING, NEVADA (3.3.2)

The proposed base site is 46 mi north of Las Vegas along U.S. Highway 93, which runs north and south through this area. This route provides the primary access to the vicinity of the proposed base. State Highway 7 runs southeast from the proposed site until it connects with Interstate 15 about 25 mi away, near the community of Moapa. Moapa is one of several small communities near the northern tip of Lake Mead. Figure 3.3.2-1 is a schematic map of the area showing principal roads and neighboring communities.

U.S. 93 in this vicinity is a low volume road with an average daily traffic (ADT) of only 650 in 1980. About 10 mi north of Las Vegas it joins with Interstate 15, which has an ADT in this vicinity of 6,800. State Highway 7 has an ADT of less than 100 immediately southeast of its intersection with U.S. 93. Although the population of Clark County is expected to increase by around 50 percent by 1992, traffic levels are expected to remain very low near the proposed site unless the M-X project or some other major project is constructed in the vicinity.

DELTA, UTAH (3.3.3)

The proposed base site is approximately 20 mi west of the community of Delta along U.S. Highway 50, which is the only major road near the site and must be relied on for access. Near the community of Delta a number of state and county roads crisscross the area. Figure 3.3.3-1 is a schematic map showing the proposed site, major roads in the area, 1978 traffic volumes, and neighboring communities.

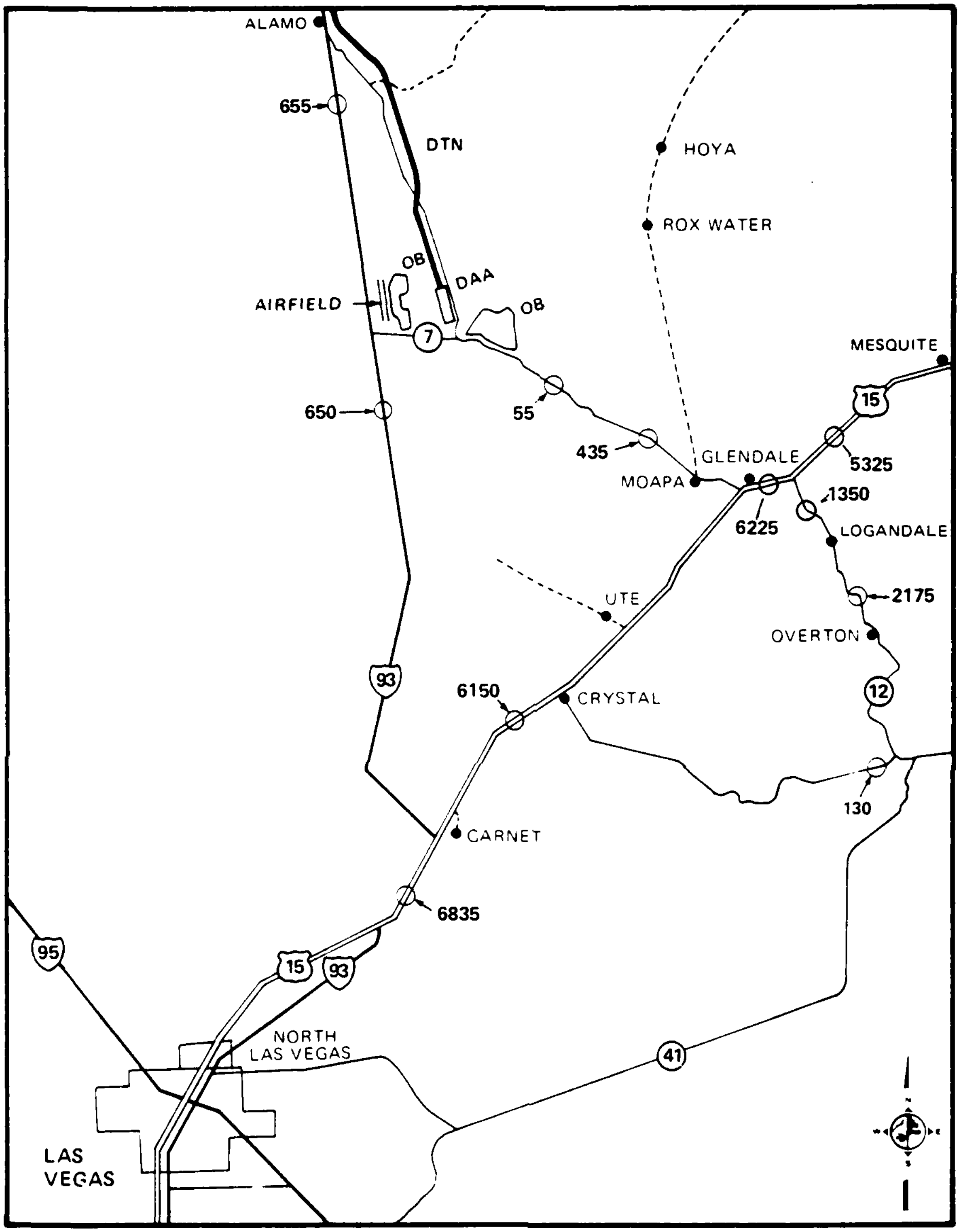
The 1978 ADT on U.S. 50 near the proposed site was 530 vehicles. Within the community of Delta, traffic along U.S. 50 is considerably higher.

Northeast of Delta is the proposed site of the Intermountain Power Plant. This would be a major project currently scheduled for construction in the late 1980s. If the project is constructed, a large number of construction workers will move into the area. As a result, traffic will undoubtedly increase in the entire area, especially within Delta and other communities to the northeast, but it is not likely that traffic volumes will be significantly affected near the proposed base site itself. Traffic within Delta and other communities near the Power Plant would undoubtedly increase causing some congestion and the need for some road improvements.

Population projections for Millard County vary, depending upon the amount of non-M-X-induced growth anticipated. By 1993 the population is anticipated to increase between 40 and 75 percent. Even a 75 percent increase in traffic on U.S. 50 between the proposed base site and Delta could easily be accommodated by the existing highway.

ELY, NEVADA (3.3.4)

The proposed base site is located 10 mi south of the city of Ely on the Pioche Highway (U.S. Highways 50 and 93). Major access to the vicinity of the proposed base will be along this route. U.S. 50 runs northwest from Ely past the town of Ruth, 8 mi away, and U.S. 93 runs north through the town of McGill, 12 mi away.



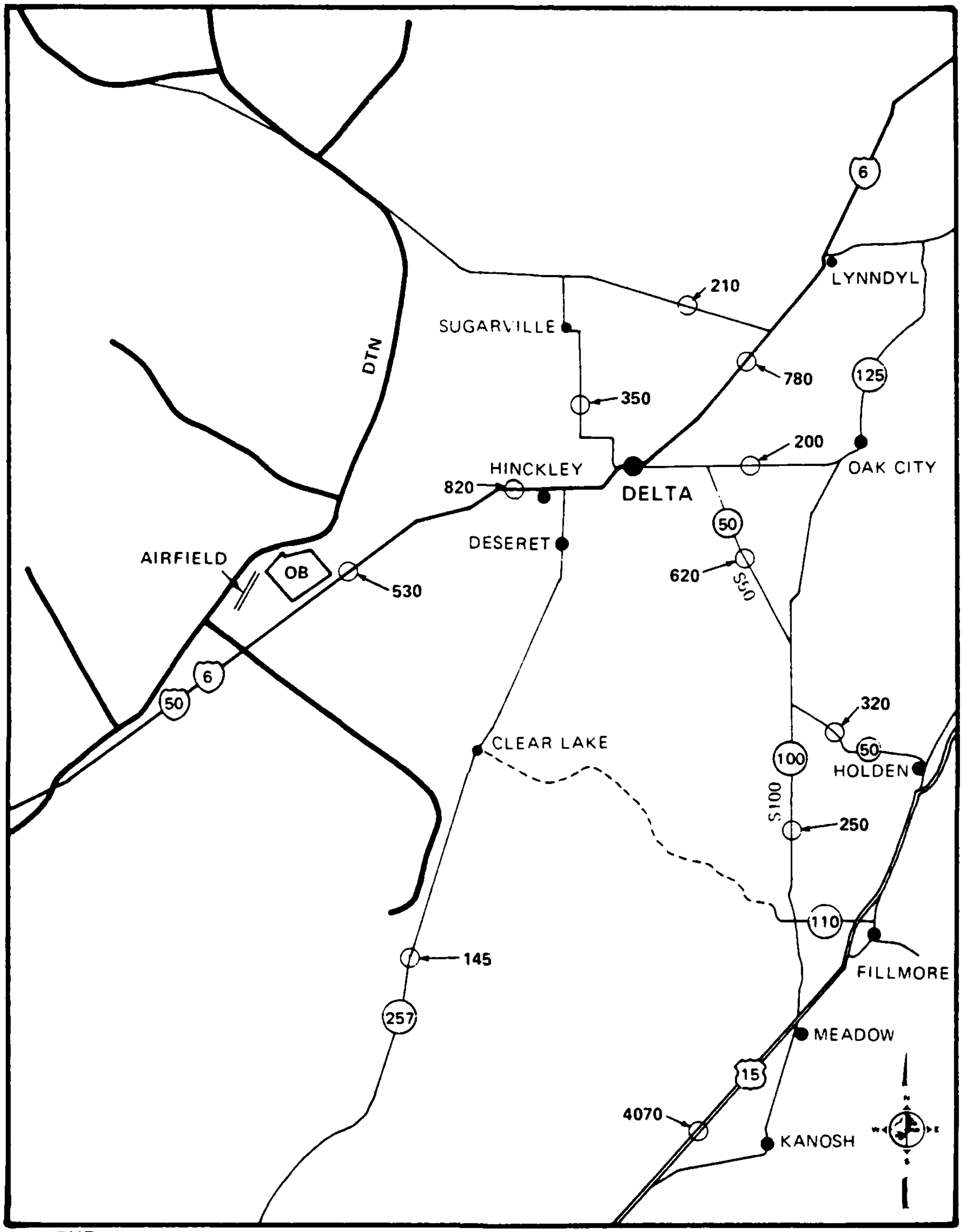
LEGEND 000 - 1980 TRAFFIC VOLUMES; COYOTE SPRING, NEVADA

2183-A-2

SCHEMATIC NOT TO SCALE

SOURCE NEVADA DEPARTMENT OF TRANSPORTATION

Figure 3.3.2-1. Existing road network and traffic volumes in the vicinity of Coyote Spring, Nevada.



LEGEND 000 - 1978 TRAFFIC VOLUMES, DELTA, UTAH

SCHEMATIC NOT TO SCALE 2182-A-1

SOURCE: UTAH DEPARTMENT OF TRANSPORTATION

Figure 3.3.3-1. Existing road network and traffic volumes in the vicinity of Delta, Utah,

A schematic map of the existing road network and neighboring communities is shown on Figure 3.3.4-1. Also shown are the 1980 traffic volumes. The Pioche Highway between the proposed base site and Ely has an ADT of only 875 vehicles and unless some major industry moves into the area it is not expected to increase appreciably. White Pine County, as a whole, is expected to increase in population between 24 and 82 percent even without M-X. A corresponding increase in traffic along the Pioche Highway (even for the higher scenario) would mean an increase to only 1,500 vehicles per day, well within the capacity of the highway.

MILFORD, UTAH (3.3.5)

The proposed base site is located approximately 20 mi southwest of the community of Milford. Access to the proposed site is provided by unsurfaced roads from Milford and Minersville. The community of Milford is served by state routes 257 and 21 plus other minor county roads. A schematic map of the existing road system in the area is shown on Figure 3.3.5-1 along with 1978 traffic volumes. No major increases in traffic are anticipated in this area without the M-X project.

CLOVIS, NEW MEXICO (3.3.6)

The proposed base site involves an expansion of an existing facility, Cannon AFB. It is located approximately 10 mi west of Clovis on U.S. Highway 60, which runs east and west through the area. This is the primary access route and carries the large majority of traffic to the existing base. State Route 467 extends south from near the base and provides access to Portales, 13 mi to the south. Figure 3.3.6-1 is a schematic map of the area showing the major roads in the vicinity and neighboring communities.

U.S. Highway 60 is a four-lane road with average daily traffic of 12,990 vehicles in the vicinity of Cannon AFB. Traffic on this road is expected to remain about the same without M-X-induced growth and the road should continue to provide a good level of service. State Route 467 is a low volume two-lane road currently classified as a secondary road. Traffic on this road is unlikely to increase appreciably without the M-X project since U.S. Highway 70 roughly parallels it to the east and provides a much better route between Portales and Clovis.

DALHART, TEXAS (3.3.7)

The proposed base site is 10 mi southwest of the town of Dalhart. It lies along U.S. Highway 54, which is the only major route near the proposed site. U.S. Highway 385 runs north and south through Dalhart and provides access to Dumas, 48 mi to the east via U.S. Highway 87, and Amarillo, 100 mi to the southeast.

Figure 3.3.7-1 is a schematic map showing the major roads in the vicinity, 1975 traffic volumes, and neighboring communities. All of the existing roads in the area are good quality two-lane roads that presently operate at a good level of service. U.S. 54 has average daily traffic of 1,830 vehicles near the proposed site and U.S. 385 has average daily traffic of 4,300 vehicles south of Dalhart.

There is an existing low-volume county road, running west from Hartley which passes near the proposed site. It is assumed that a connection would be made to the base from this road to provide better access to the site from Hartley and other points east.

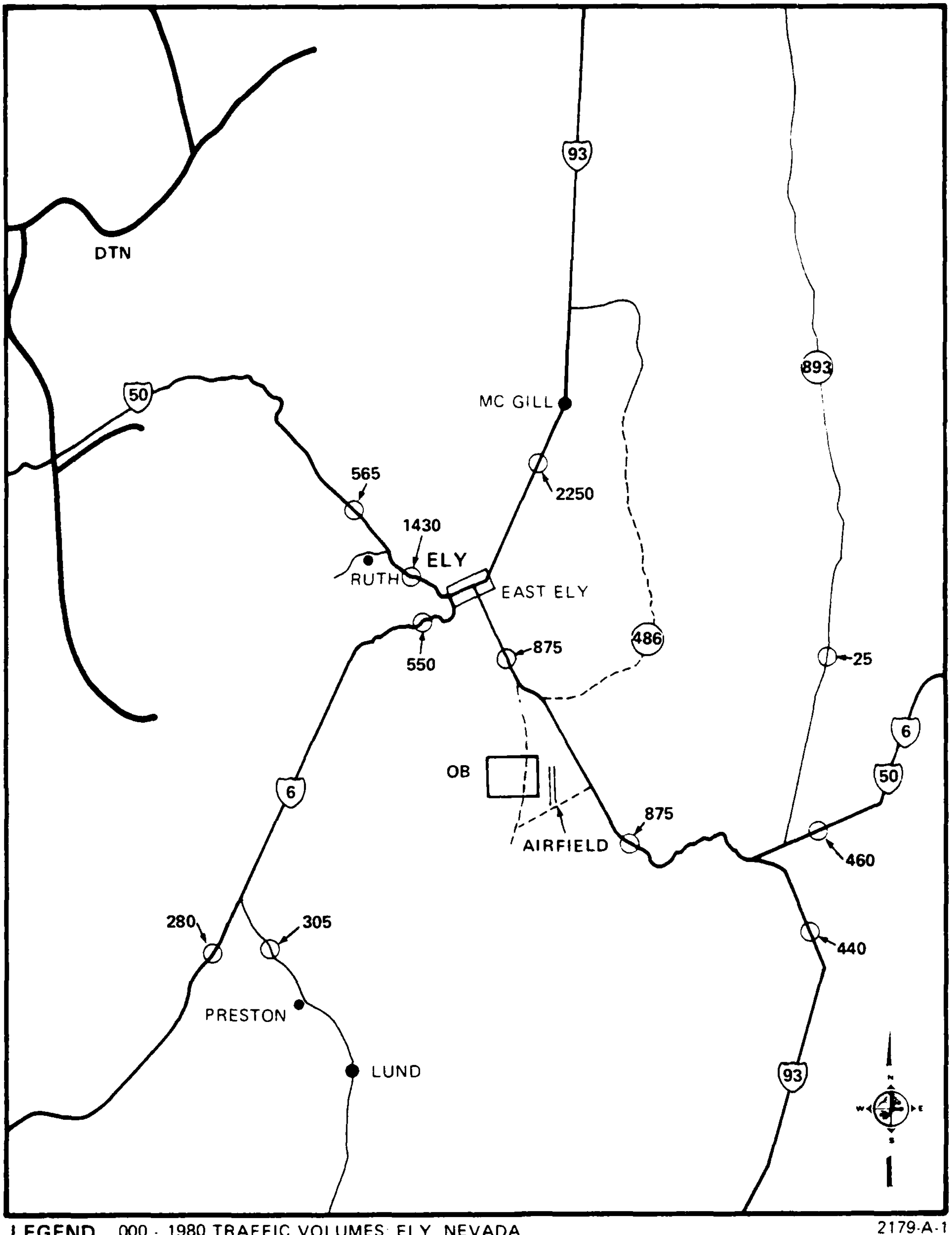
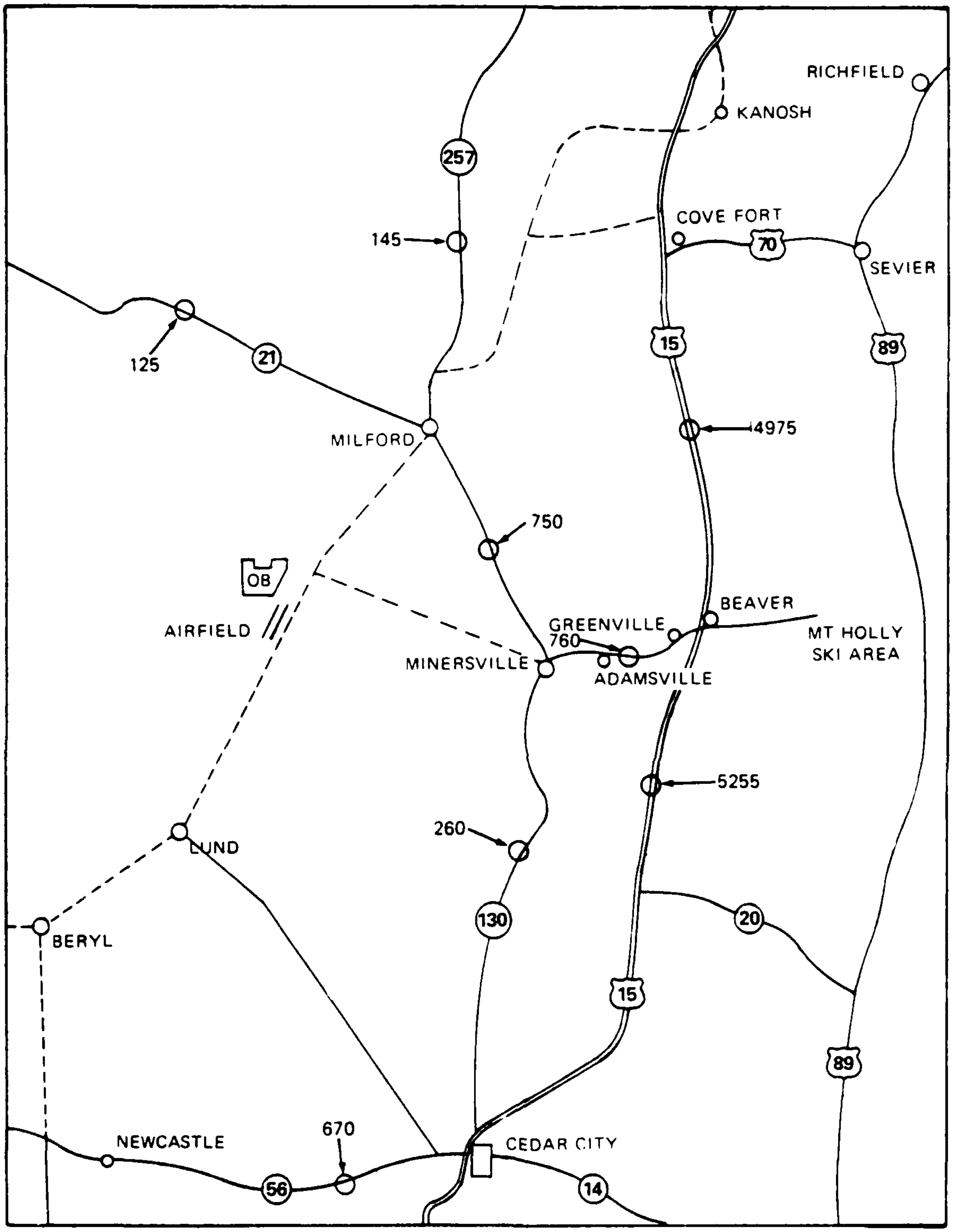


Figure 3.3.4-1. Existing road network and traffic volumes in the vicinity of Ely, Nevada.



LEGEND 000 1978 TRAFFIC VOLUMES; MILFORD, UTAH
SOURCE: UTAH DEPARTMENT OF TRANSPORTATION
DASHED LINES INDICATE EXISTING UNPAVED ROADS

Figure 3.3.5-1. Existinq road networks and traffic volumes in the vicinity of Milford, Utah.

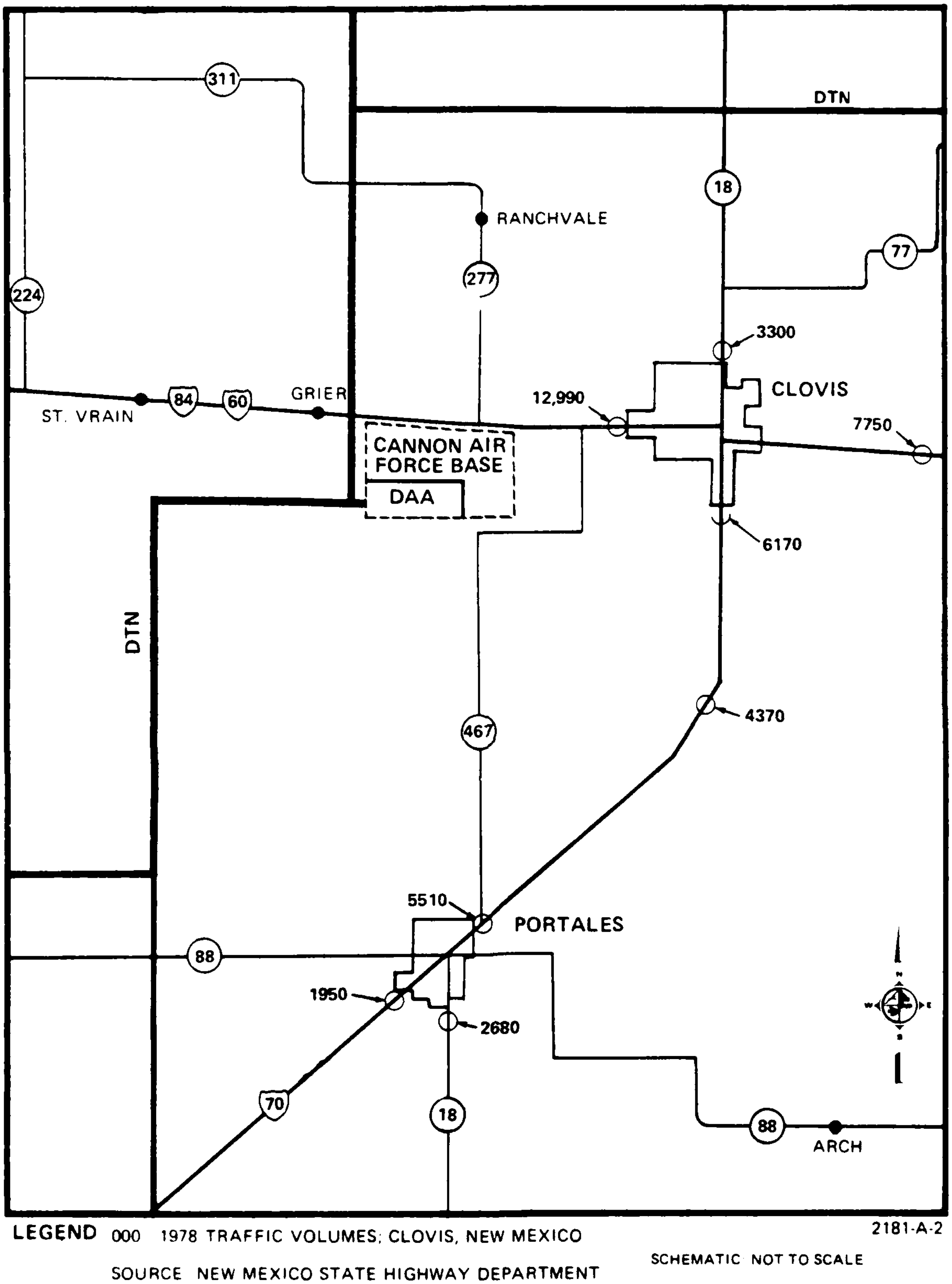
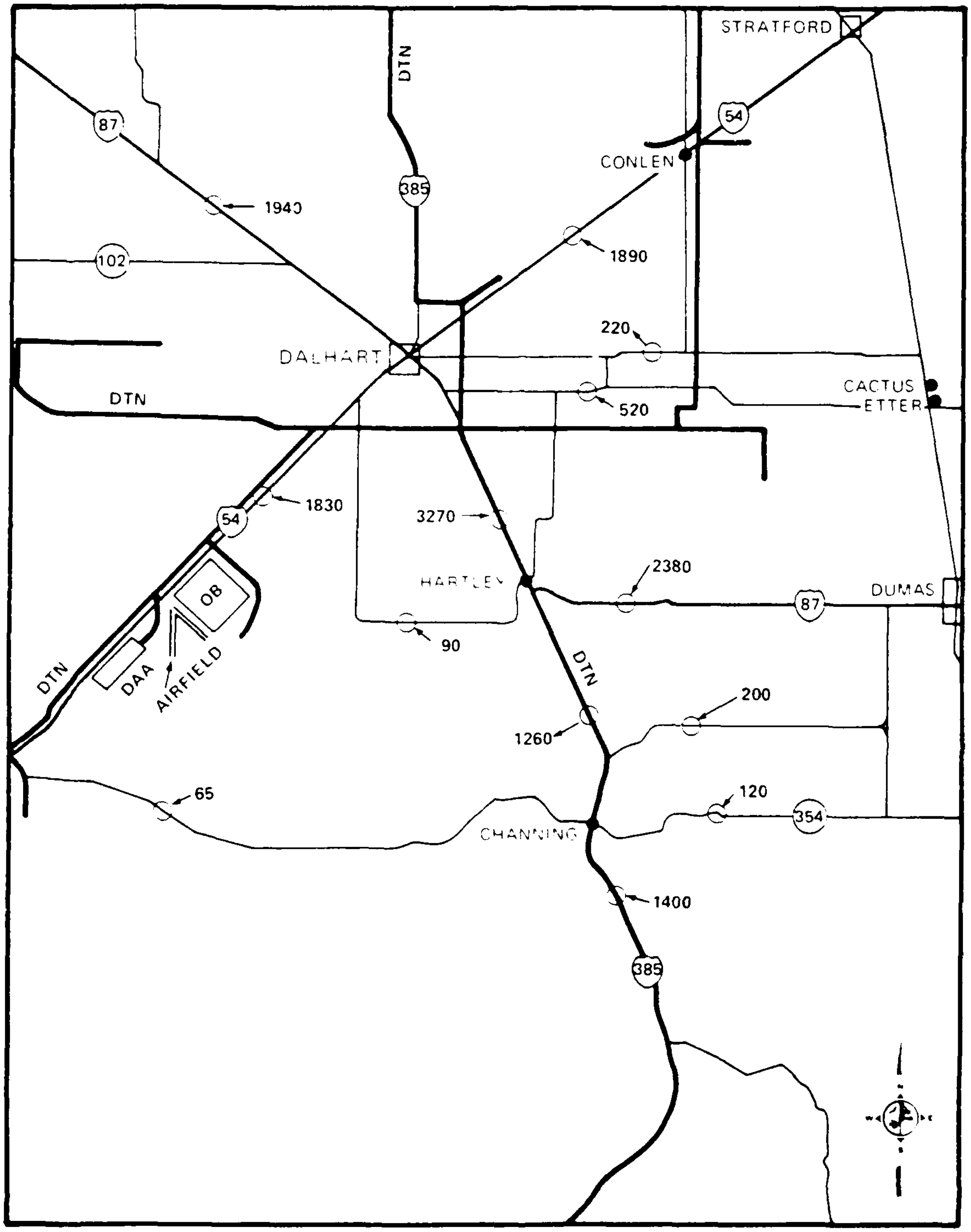


Figure 3.3.6-1. Existing road network and traffic volumes in the vicinity of Clovis, New Mexico.



LEGEND 000 1975 TRAFFIC VOLUMES, DALHART, TEXAS

SCHEMATIC NOT TO SCALE 2180-A-1

SOURCE TEXAS STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

Figure 3.3.7-1. Existing road network and traffic volumes in the vicinity of Dalhart, Texas.

4.0 PROJECT EFFECTS AND ANALYSIS

4.1 NEVADA/UTAH DEPLOYMENT AREA

Construction of the M-X system would affect the road system in Nevada/Utah in two ways; the road system would be greatly expanded, almost 9,000 mi of new roads would be constructed; and traffic upon the system would increase substantially, especially during the construction phase. This increase in traffic would in turn result in increased maintenance costs for existing roads, or require that some roads be reconstructed or improved to accommodate the traffic.

The analysis in this report is based upon the conceptual layouts and construction scenario discussed in Chapter 1 of the EIS. Changes to camp locations, construction scheduling, or other factors could change the magnitude or location of impacts. Moreover, implementation of mitigation measures could substantially reduce the anticipated impacts. These are discussed in Section 5.

ACCESSIBILITY (4.1.1)

Accessibility within the various hydrologic subunits varies greatly between very good to very poor at the present time. The impact on accessibility therefore can be measured in terms of the degree of improvement and/or expansion of the road system within each subunit. Increasing accessibility is significant for a number of reasons. It would provide a long-term benefit to the area since all of the roads would be available for use by the public and many poor quality existing roads would be improved by the project. An expanded road system would also facilitate development in the region and the use of the area for recreation. On the other hand, construction of the roads would disturb natural vegetation which would, in turn, affect wildlife due to removal of habitat. It would also increase the potential for damage to sensitive resources in formerly remote areas due to the increased use of the area. The direct and indirect impacts on other resources associated with an increase in accessibility is discussed in the EIS and other ETRs listed in Chapter 5.

Access is currently very poor within some of the hydrological subunits, notably Coal, Garden, and Hamlin. In these subunits construction of the project would significantly improve access and result in corresponding impacts on other resources.

In most of the other subunits roads are numerous, but most are of poor quality and not usable during poor weather except by off-road vehicles. Construction of the project roads would improve the quality of these roads since they would be maintained for all weather use. In those areas the impact on accessibility is considered to be moderate. In the remaining subunits, the existing road system is of better quality and the addition of project roads would have only a low impact on the accessibility. Where only a small area of a subunit would have project roads within it the impact is also considered to be low.

TRAFFIC (4.1.2)

Increases in traffic on the existing roads would also cause significant impacts within the region. The majority of the impacts would occur during the construction phase. Most of the construction traffic itself would utilize the newly constructed

DTN and/or cluster roads which would preclude, to a large degree, conflicts with traffic on existing highways. However, some conflicts would occur between construction traffic and current highway traffic at points where the DTN and cluster roads cross or coexist with existing roads (Table 4.1-1). While there would be a large number of these intersections, the actual effects of construction traffic on other traffic should be small since an overpass would be constructed at all federal and state routes and all other points where the DTN crosses an existing road that has average daily traffic over 500 vpd. These could be used by construction vehicles if they are constructed very early in the construction period. Moreover, cluster roads are specifically designed to avoid crossing or coexisting with any road that has average daily traffic over 250 vpd. Nevertheless at some of the intersections there would be localized short-term delays to some motorists due to the crossing of construction vehicles. Localized improvements would be made where necessary to ensure safety and an orderly flow of traffic. These locations would be identified on a case-by-case basis and site-specific improvement would be made. This may include the installation of temporary signs, or signals, or the temporary use of flagmen.

The major adverse impacts due to the project would be caused by trucks delivering materials and supplies and by construction workers, both those commuting to the construction areas from neighboring communities and those that would reside at the construction camps. This traffic would generally use the existing roads. In most cases it would be substantially greater than current traffic and would tend to be concentrated during peak periods. During peak periods the large majority of vehicles are expected to be passenger vehicles. Some inconvenience and delay would result, primarily at locations where capacity is severely restricted, such as at mountain passes. Table 4.1-2 lists the mountain passes where the theoretical capacity is expected to be exceeded unless mitigation measures are adopted. Theoretical capacities were estimated based upon procedures outlined in the Highway Capacity Manual (Highway Capacity Manual, 1965), including adjustments for grades, roadway characterstics, and percentage of trucks. The theoretical capacity of two-lane roads signals the maximum number of vehicles that can be accommodated without serious disruption to traffic flow. When the theoretical capacity is reached, or exceeded, as is probable in the case of these mountain passes, the resultant traffic flow is characterized by queues of vehicles with little or no opportunity to pass generally backed up behind slow moving trucks. Possible measures to mitigate the impacts include the construction of truck climbing lanes on steep grades, staggered work shifts, and use of buses or carpools. Mitigation measures are discussed in Section 5.

Peak hour commute traffic is likely to exceed capacity on US.50 between Tonopah and the construction camp located approximately 30 miles east, from 1986 through 1988. Other roads likely to experience increases in traffic greater than 1,000 vehicles per day during one or more years are the following:

Nevada

U.S. 93 between the I-15 interchange and Pioche in 1985 through 1987.

U.S. 6 southwest of Ely in 1986 and 1987.

U.S. 50 from about 10 miles west of Eureka to Ely in 1987 and 1988.

Table 4.1-1. Intersections between proposed project roads and existing roads and railroads - Nevada/Utah.[1]

Alternative	Intersections With Existing Roads: DTN Federal or State	DTN Paved	DTN Other	Cluster Roads[2] Paved	Cluster Roads[2] Other	Intersections With Railroads and the DTN[3]
Proposed Action Alternatives 1-6	32	3	295	2	1,783	-
8	12	1	125	1	822	-

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[1] At all intersections with state and federal routes, county roads with average daily traffic over 500 vehicles per day and all railroad crossings, overpasses will be constructed.

[2] Cluster roads are specifically designed not to intersect with any road that has an average daily traffic over 250 vehicles per day.

[3] Cluster roads will not cross railroads.

Table 4.1-2. Projected peak hour traffic by construction personnel and A&CO in mountain pass segments, Nevada/Utah.

Segment	Theoretical Estimated Capacity[2] (Veh/Hr) Peak Hour	Estimated Peak Hour Existing Traffic (Veh/Hr)	Projected Traffic Volumes[1] Construction Personnel Commute Trips (Veh/Hr)	Total Existing Traffic and Commute Trips (Veh/Hr)	Construction Personnel Recreational Trips[3] (Veh/Hr)	Total Existing Traffic and Recreational Trips (Veh/Hr) Peak Hour
Skull Rock Pass	220	65	210	285[4]	350	415[4]
Kings Canyon Pass	220	65	210	275[4]	350	415[4]
Sacramento Pass	200	95	210	305[4]	290	385[4]
Conners Pass	330	160	330	490[4]	290	450[4]
Robinson Pass	450	95	960	1,055[4]	190	285
Little Antelope	450	95	960	1,055[4]	190	285
Richmond Mountain	420	80	460	540[4]	420	500[4]
Austin Summit	250	110	60	170	420	530[4]
Squaw Peak	760	25	920	945[4]	290	315
Wah Wah	630	25	620	645[4]	190	215
Caliente	480	150	530	680[4]	510	660[4]
Hancock Summit	470	20	370	390	530	550[4]
Currant Summit	200	25	620	645[4]	100	125
Murray Summit	280	90	660	750[4]	200	290

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[1] Projected traffic in this table is based upon the average over an entire year, during peak summer months traffic volumes could be up to 35 percent higher.

[2] Theoretical capacity is based upon length of grade, width of lanes plus shoulders, and the estimated percentage of trucks. Refer to Table 3.1-1 for the location and a description of each of these passes.

[3] These traffic volumes are expected to occur only twice a week at most, during shift changes such as on weekends.

[4] Exceeds theoretical capacity.

Note: These peak hour volumes will occur only during one year (in different years for different passes). In other years the volumes would be less. They do, however, highlight the anticipated volumes of traffic relative to existing capacity that would occur unless mitigation measures are implemented.

State Route 25 northwest of the intersection of US.93 in 1987.

State Route 38 from the intersection with US.93 to approximately 30 miles north in 1985 and 1986.

Utah

US.50 southwest of Delta in 1985 through 1987, and between Delta and I-15 in 1987.

US.6 from Delta to State Route 132 in 1988.

State Route 21 from approximately 50 mi west of Milford to I-15 in 1985 and 1986.

Traffic increases in excess of 1,000 vehicles per day is used to identify two-lane roads likely to experience significant traffic problems as a result of MX related traffic. Assuming the additional traffic would occur primarily within the morning and afternoon peak periods, an increase of 500 vehicles per hour would cause a reduction in level of service and may exceed capacity. Capacities of these roads is at least 5,000 vehicles per day except through the mountain passes discussed earlier. Therefore, if M-X-related traffic is spread throughout the day rather than concentrated during peak periods, the existing capacity should be able to accommodate the traffic. Staggered work shifts to reduce peak traffic or the use of buses to reduce the number of vehicles could mitigate potential traffic problems. Without these mitigations however, peak commute traffic is likely to exceed capacity on some or all of these routes. Congestion and delays to motorists would result at those times. Mitigations are discussed in Section 5 and in ETR-38 (Mitigations).

Capacity is not normally used as design criteria for designing or improving roads. For rural roads level of service "B" or "C" is usually used for design purposes. However, when only short term increases in traffic are expected, lower levels of service are often tolerated when the long-term needs are much less than the short-term needs. This would be the case for most of the roads in the vicinity of M-X facilities except the operating bases. The specific road improvements that would be required for non-project roads will be identified after the final siting and design of M-X facilities. In order to mitigate the impacts on existing roads and to identify transportation requirements for both the short term and long term, the Air Force will coordinate transportation planning with federal, state, and local transportation agencies. These and other mitigations are discussed in Section 5 and in ETR-38 (Mitigations).

The construction and A&CO workers not living in the construction camps will make daily commute trips from neighboring communities. The anticipated commute trips along with current daily traffic volumes are shown in Figures 4.1-1 through 4.1-4 for the alternatives with the full system in Nevada/Utah for the years 1985 through 1988. The numbers represent the anticipated daily commute traffic between the construction camps and the neighboring communities. The estimates represent averages over an entire year. During peak summer months traffic could be as much as 35 percent higher than the figures shown. During the winter it would be correspondingly lower.

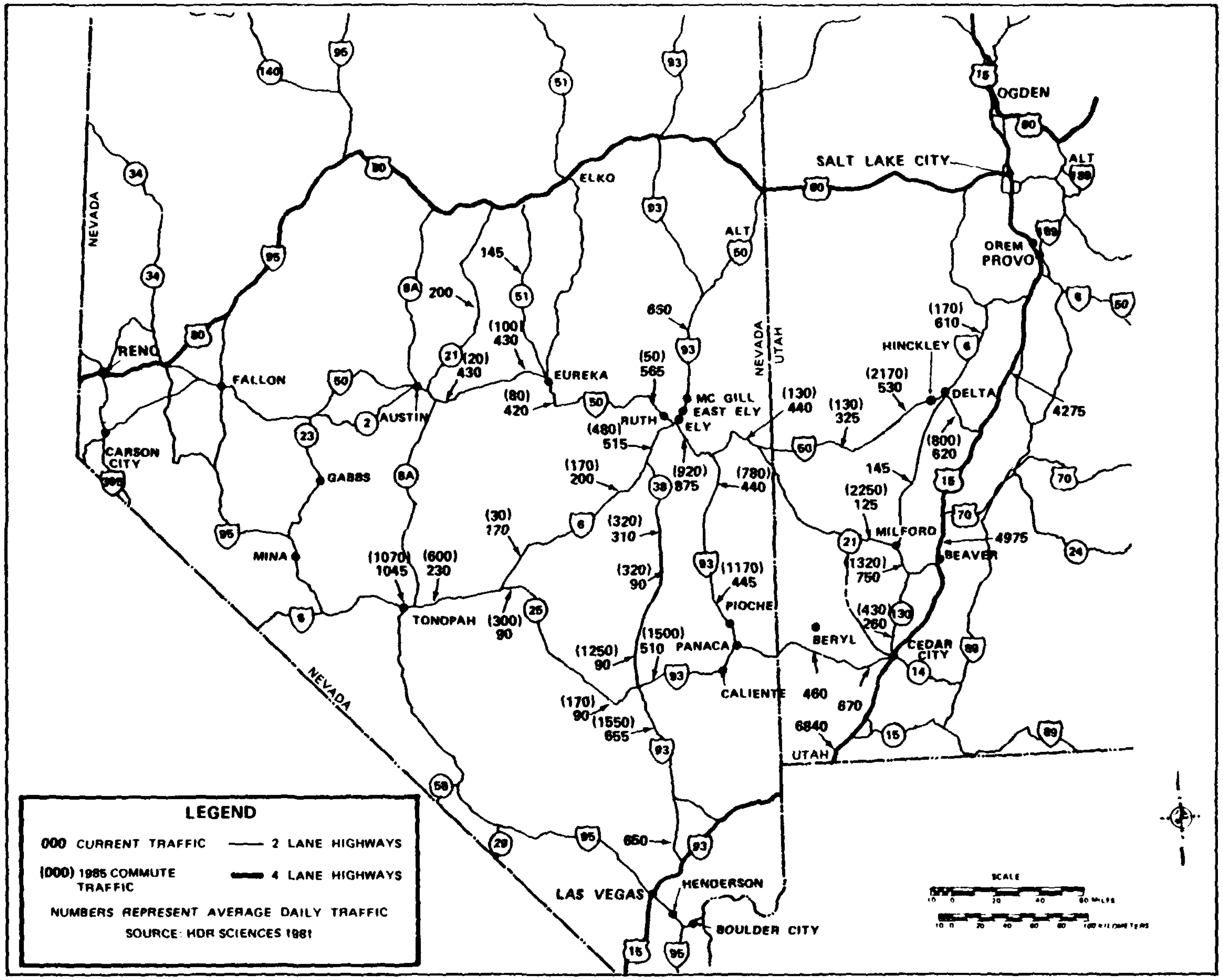

Figure 4.1-1. Projected daily commute traffic by construction and A&CO personnel in 1985 for the Proposed Action.

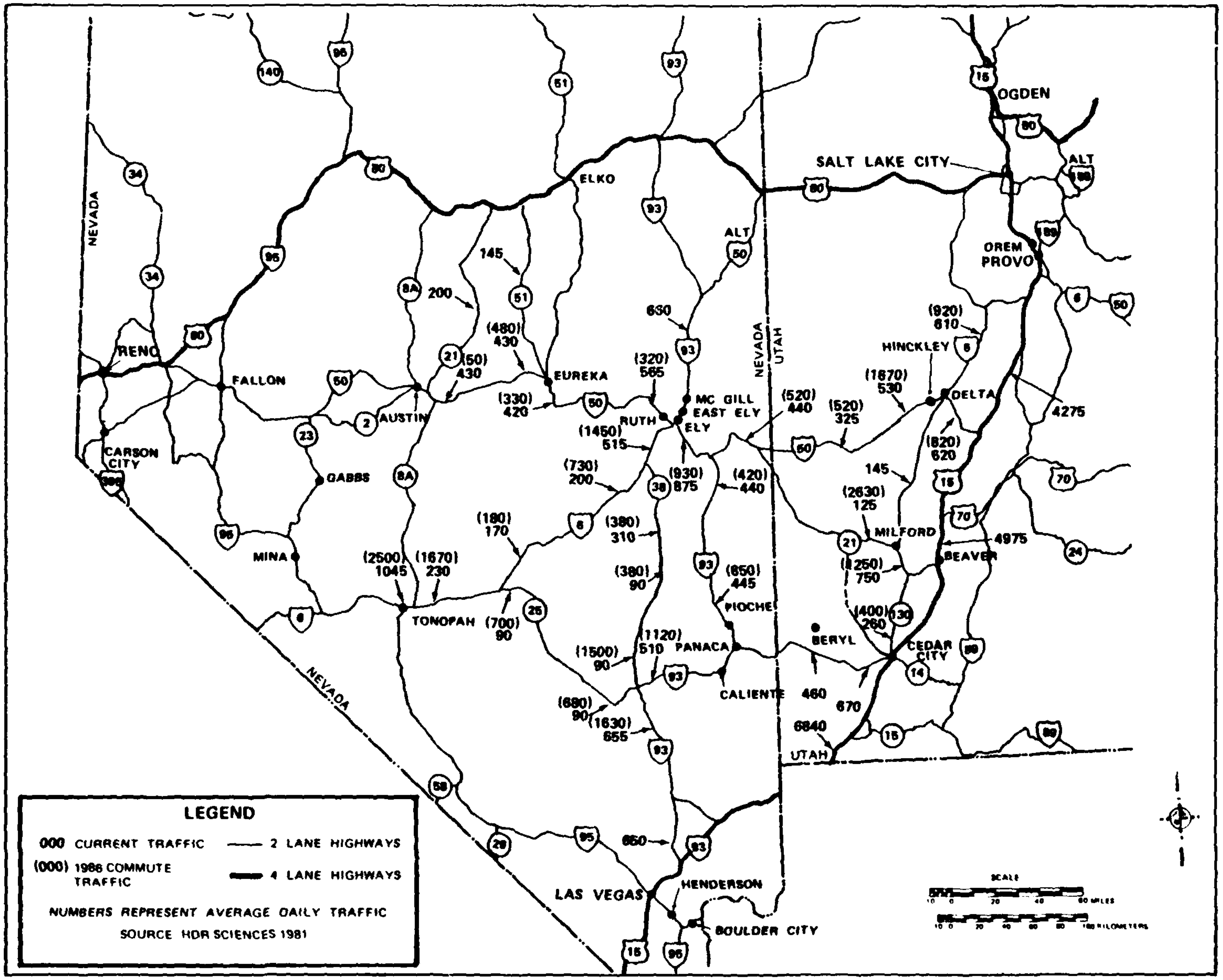

Figure 4.1-2. Projected daily commute traffic by construction and A&CO personnel in 1986 for the Proposed Action.

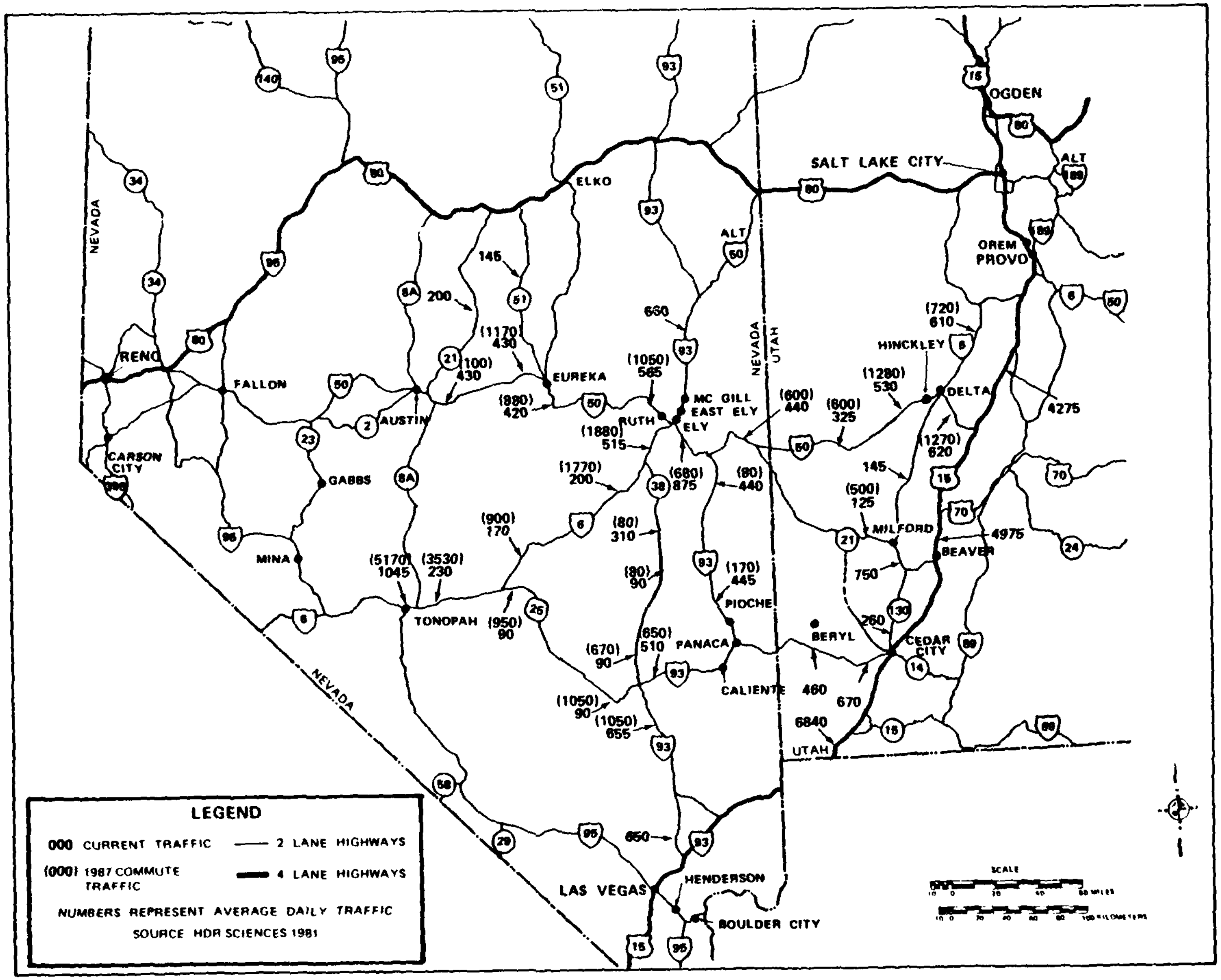

Figure 4.1-3. Projected daily commute traffic by construction and A&CO personnel in 1987 for the Proposed Action.

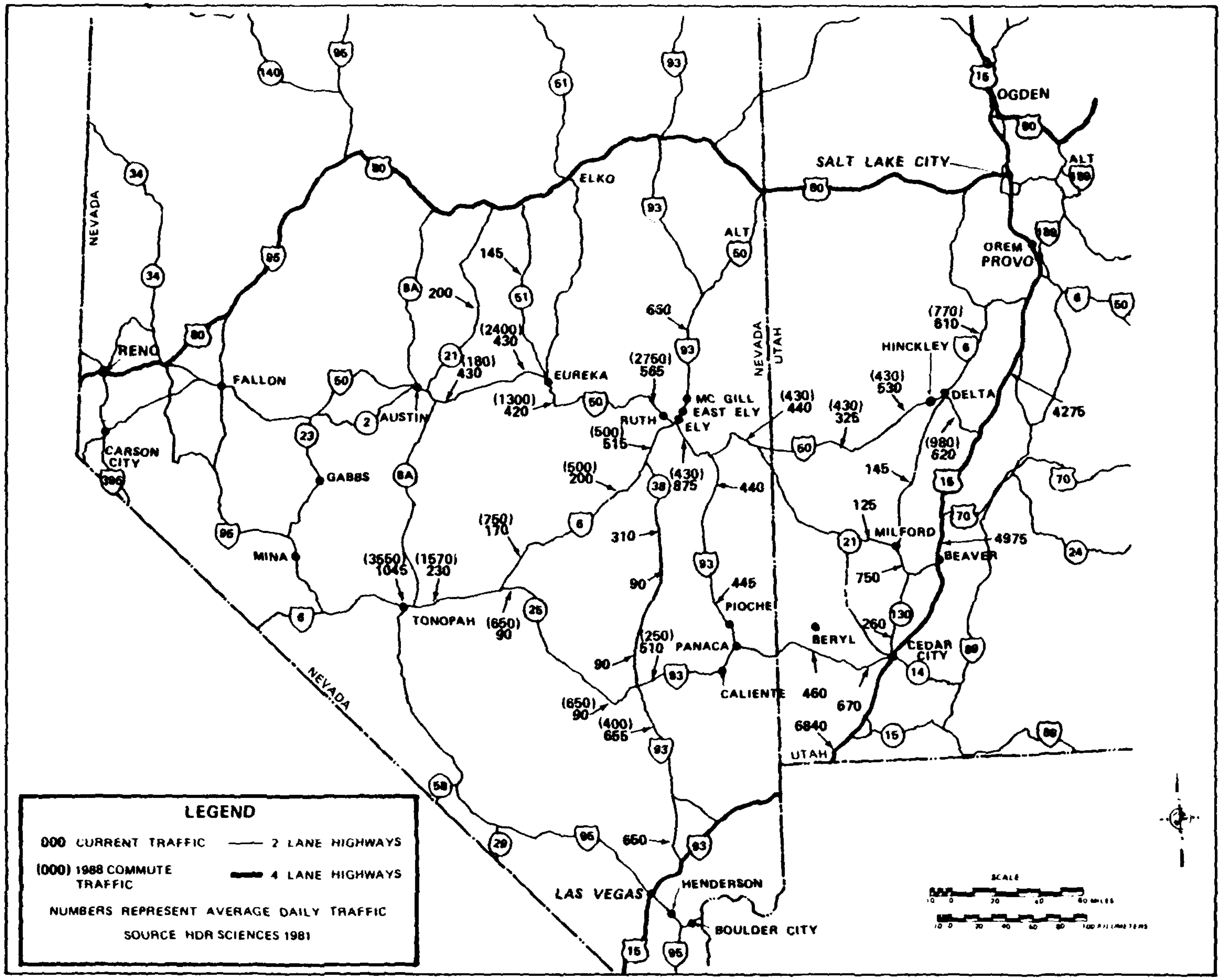

Figure 4.1-4. Projected daily commute traffic by construction and A&CO personnel in 1988 for the Proposed Action.

All of the construction and A&CO workers living at the construction camps are expected to make recreation trips during the course of the project. These will principally occur on weekends or during shift changes and not on a daily basis. Figures 4.1-5 through 4.1-8 show the anticipated recreation trips for 1985 through 1988.

At some times, such as Friday evenings, commute traffic and recreation traffic might occur simultaneously. At those times traffic volumes would be much higher than either of them individually. How often this would occur depends upon a number of factors and could be mitigated through scheduling or other actions.

Construction traffic itself will primarily use the DTN and cluster roads. It will vary from year to year and from area to area near the construction camps along the DTN. The volume and timing will depend upon the size and scheduling of each camp operation. Construction traffic along the DTN would vary from 3,500 to 6,500 vehicles per day near each of the construction camps during their peak years of operation. Its only impacts on traffic on existing roads would be at intersections. At those locations, traffic may be delayed at times due to the crossing of construction vehicles. Flagmen or temporary traffic signals may have to be used to ensure a safe and orderly flow of traffic with minimum delays. Grade separations are planned for all intersections when the existing road has current traffic over 500 vehicles per day. If the grade separations are constructed in time for use by construction vehicles, the impacts could be significantly reduced.

For Alternative 8, which has only half of the system in Nevada/Utah, the total traffic generated by the project would be only about half of that for the full system. However, the concentrations of traffic around the construction camps would be just as heavy as for the full-basing alternatives. Figures 4.1-9 through 4.1-12 show the anticipated peak year commute trips and current daily traffic volumes for Alternative 8. Figures 4.1-13 through 4.1-16 show the anticipated construction personnel recreation trips for the years 1985 through 1988.

Communities near M-X construction camps would also receive increased traffic. The two communities expected to be affected the most are Tonopah and Ely, since both have highways with heavy traffic running through them. While nearby facilities are under construction, both of these communities would experience large increases in traffic that would likely cause congestion during some periods unless improvements, such as widening or installation of traffic signals are made on critical roads. The other communities in the area would be affected, but not to the same degree. These include Panaca, Pioche, Caliente, and Alamo, plus other small communities. Localized traffic problems may occur in all of these communities. During subsequent tiered decisionmaking studies, a more detailed analysis of traffic impacts within communities will be conducted and specific mitigation measures will be identified. Until final camp locations, sizes, and scheduling are established, it would be premature to conduct more detailed studies.

During the construction of the DDA, there would be a large in-migration of people into the communities in the region who would remain only a few years. The impacts associated with this temporary influx could be dealt with in either of two ways depending upon how the local communities plan for it. If no special provisions are made to accommodate this short-term growth, the associated increase in traffic

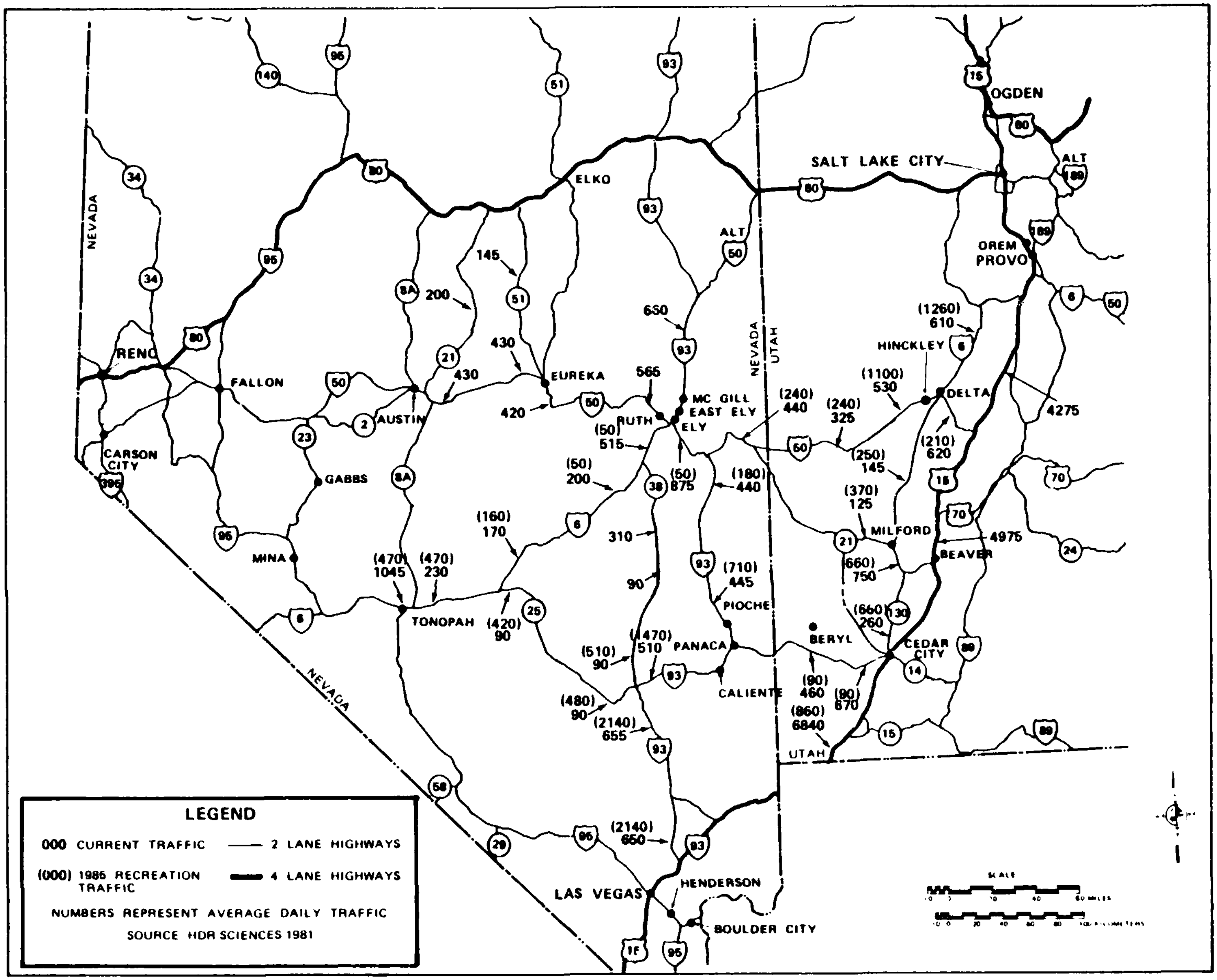

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Figure 4.1-5. Projected recreation traffic by construction and A&CO personnel living in construction camps in 1985 for the Proposed Action.

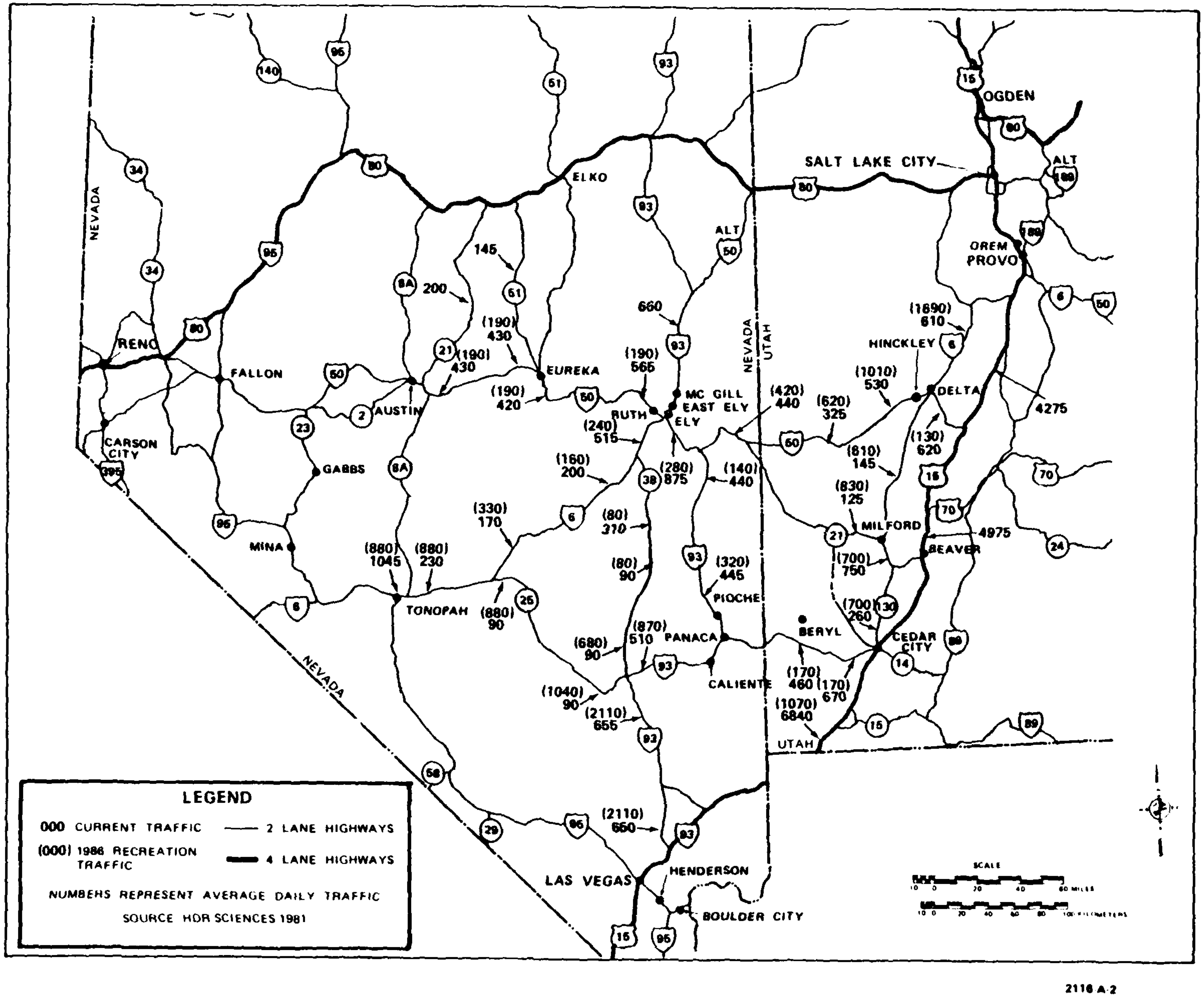

Figure 4.1-6. Projected recreation traffic by construction and A&CO personnel living in construction camps in 1986 for the Proposed Action.

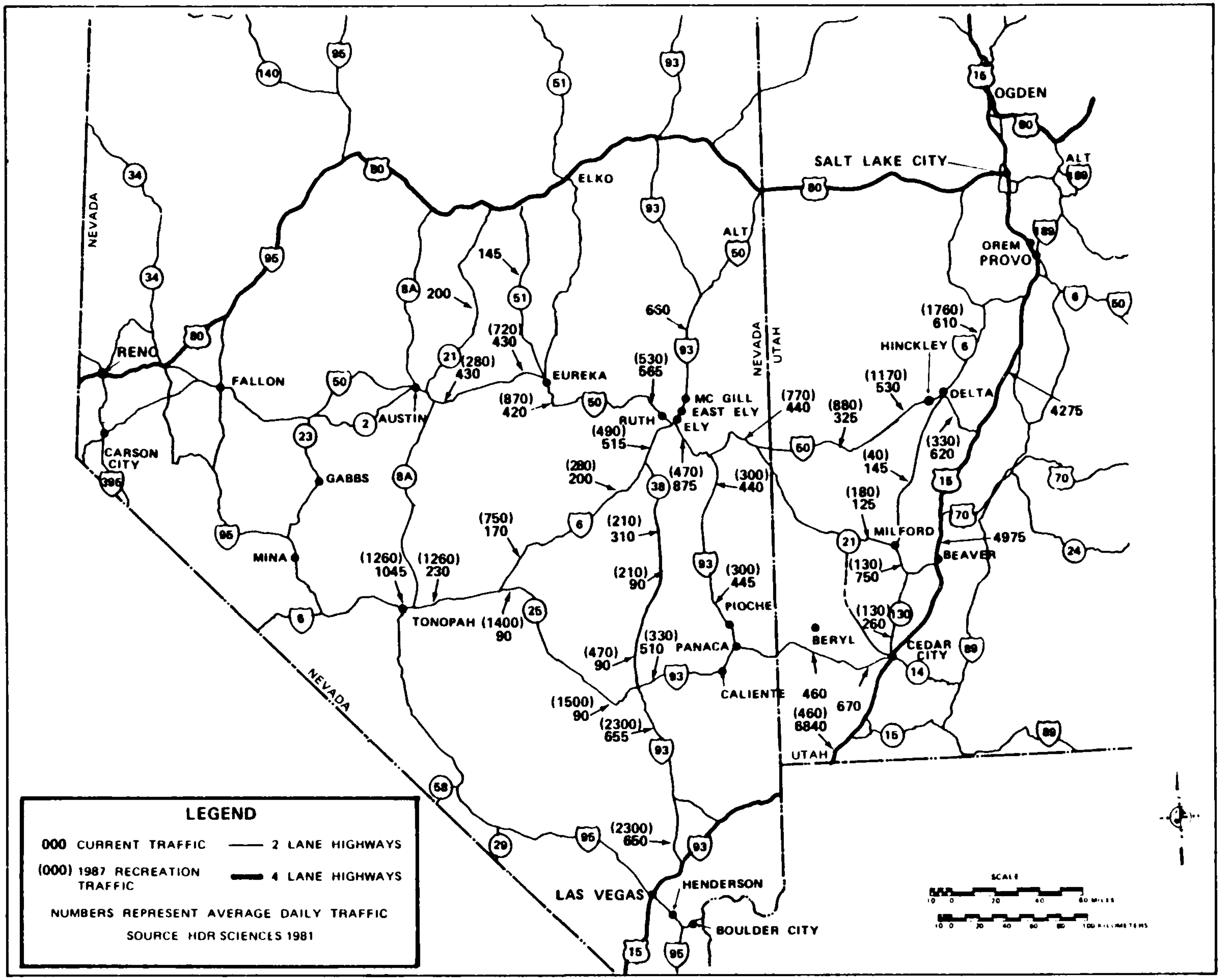

Figure 4.1-7. Projected recreation traffic by construction and A&CO personnel living in construction camps in 1987 for the Proposed Action.

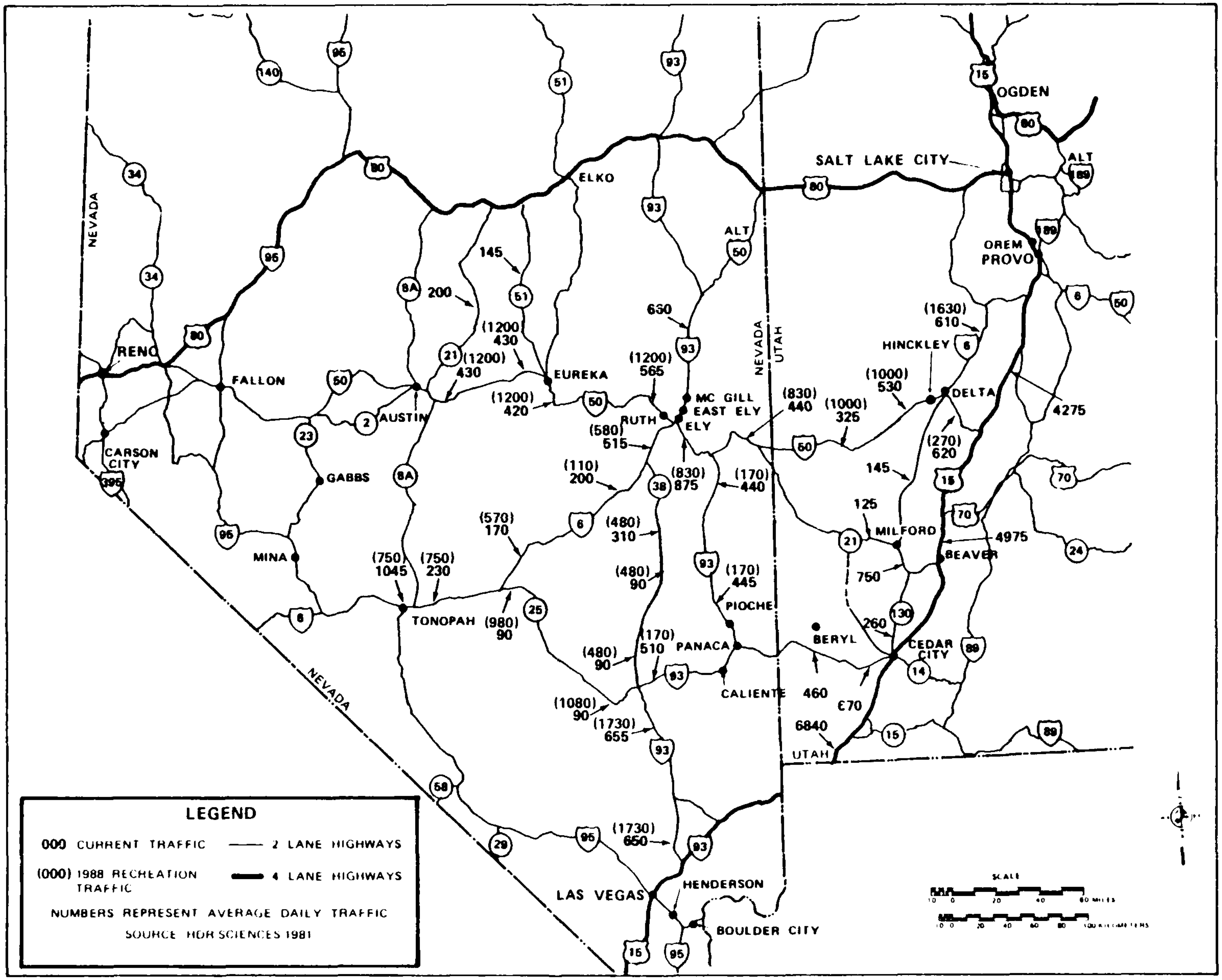

Figure 4.1-8. Projected recreation traffic by construction and A&CO personnel living in construction camps in 1988 for the Proposed Action.

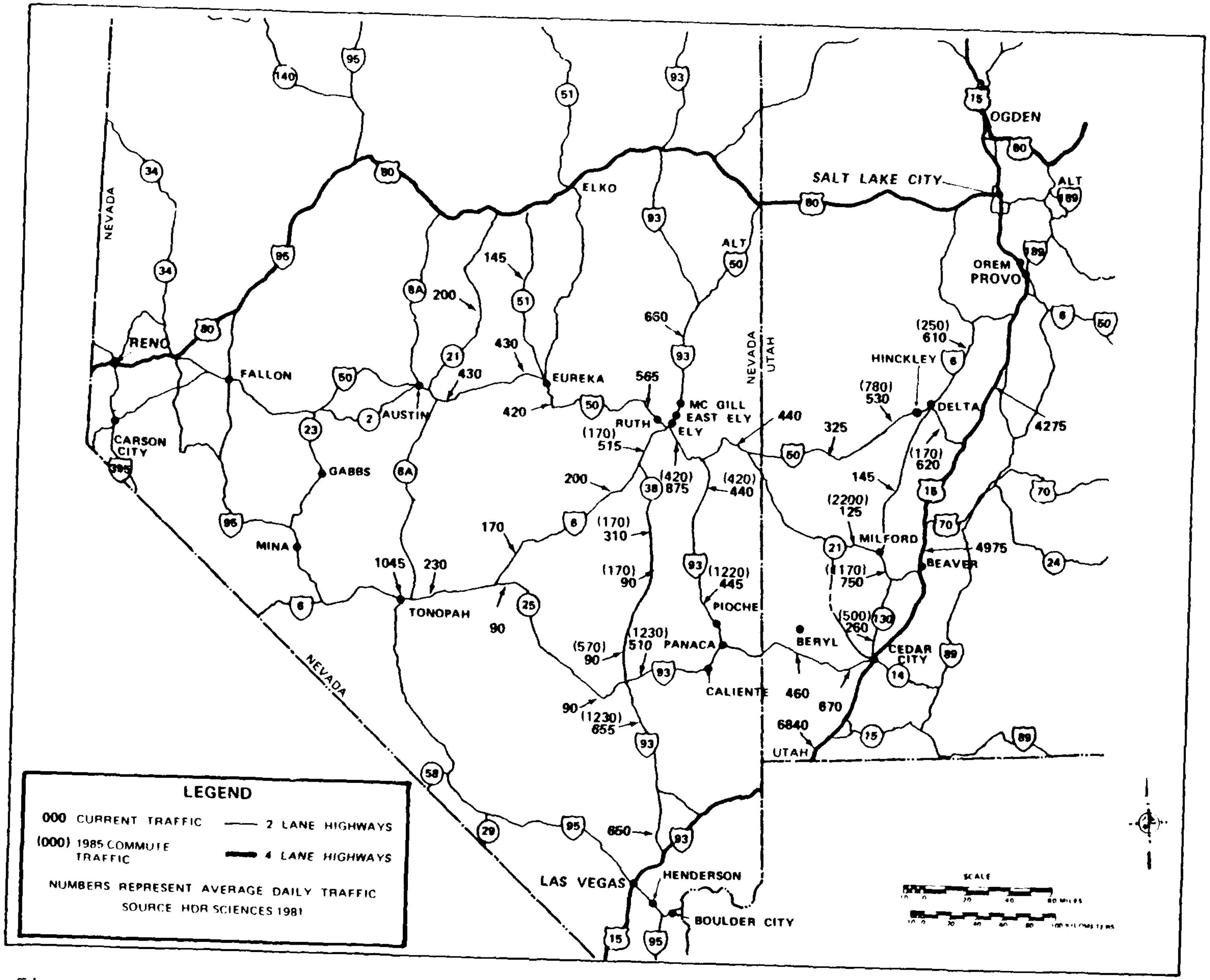

Figure 4.1-9. Projected daily commute traffic by construction and A&CO personnel in 1985 for Alternative 8.

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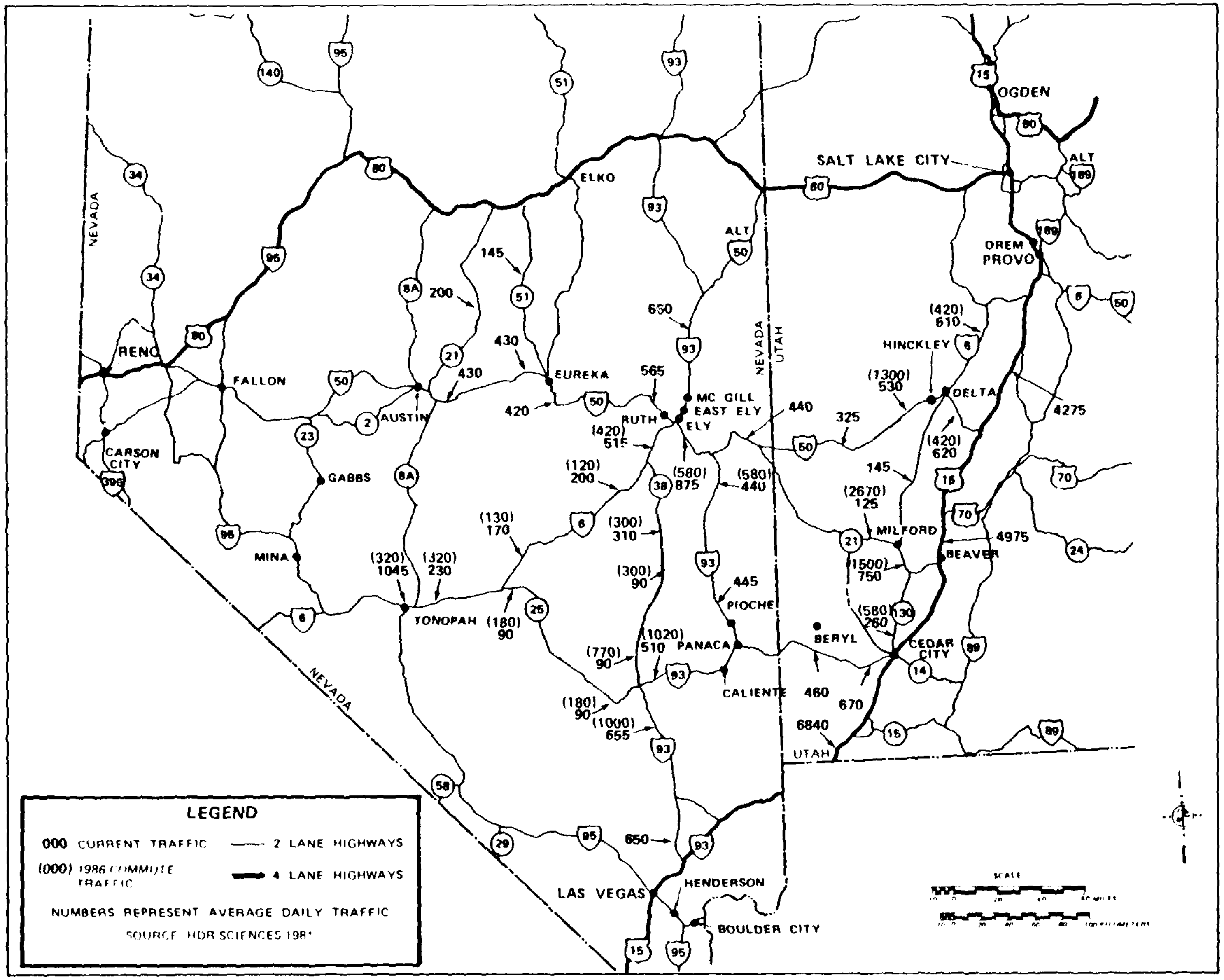

Figure 4.1-10. Projected daily commute traffic by construction and A&CO personnel in 1986 for Alternative 8.

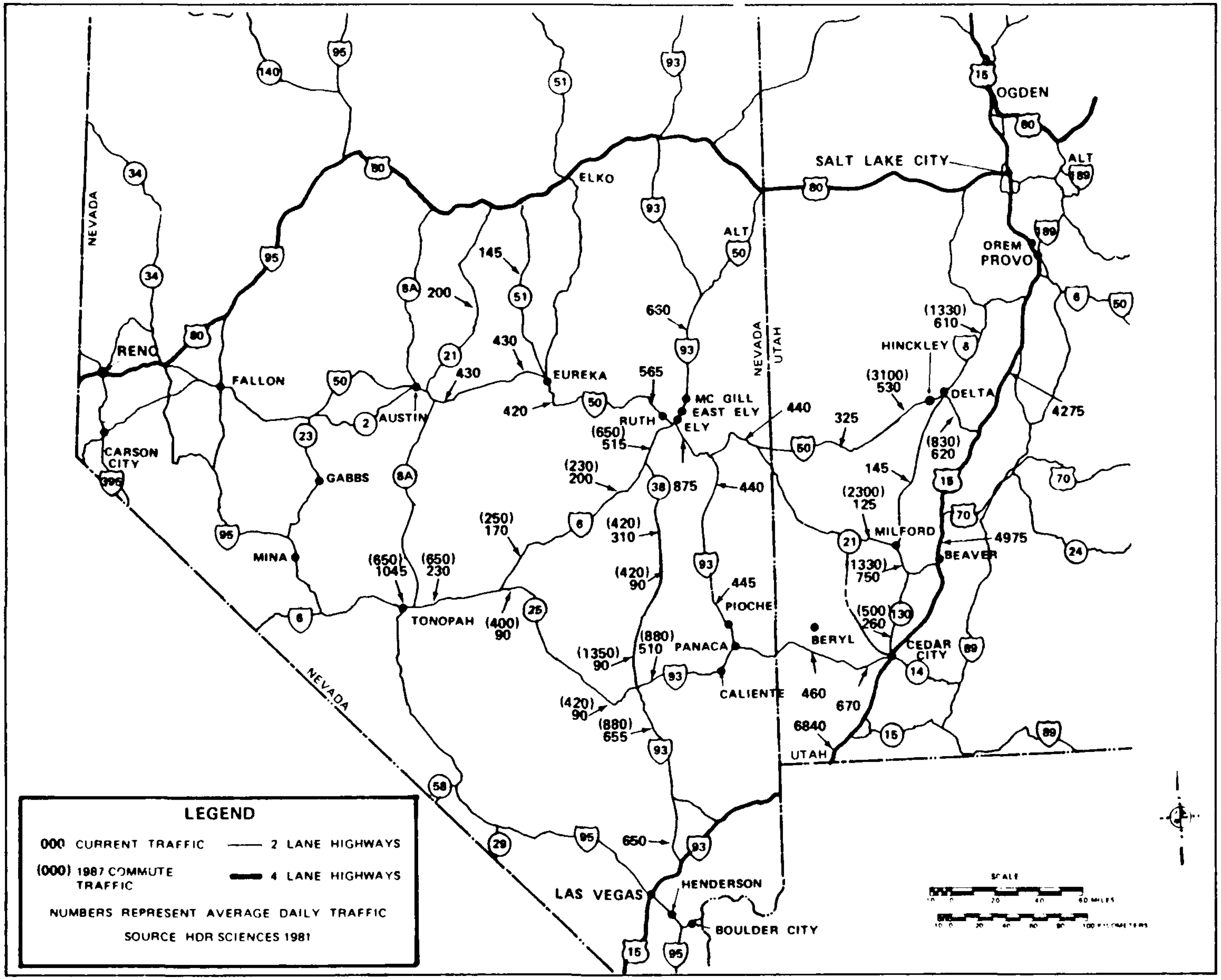

Figure 4.1-11. Projected daily commute traffic by construction and A&CO personnel in 1987 for Alternative 8.

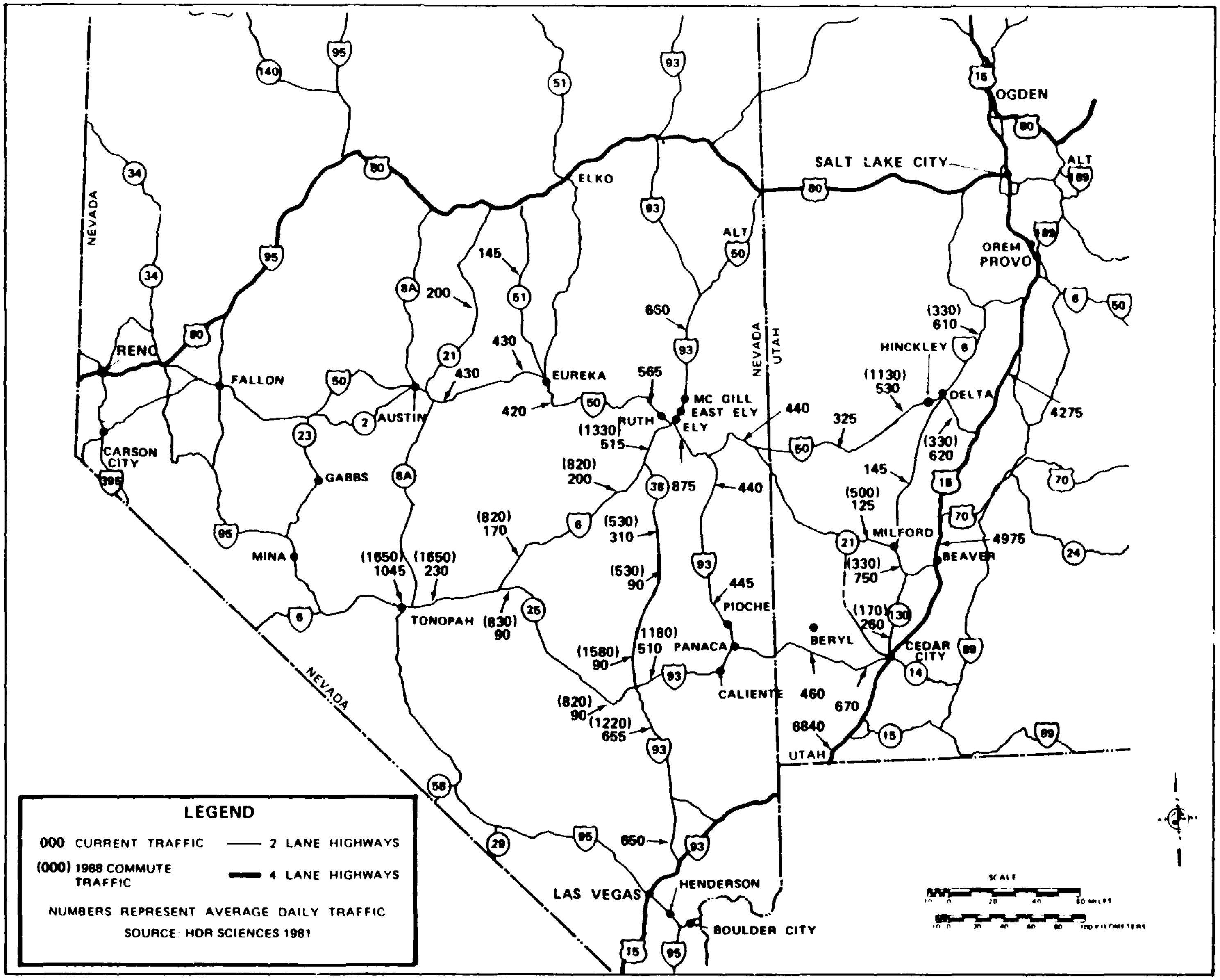

Figure 4.1-12. Projected daily commute traffic by construction and A&CO personnel in 1988 for Alternative 8.

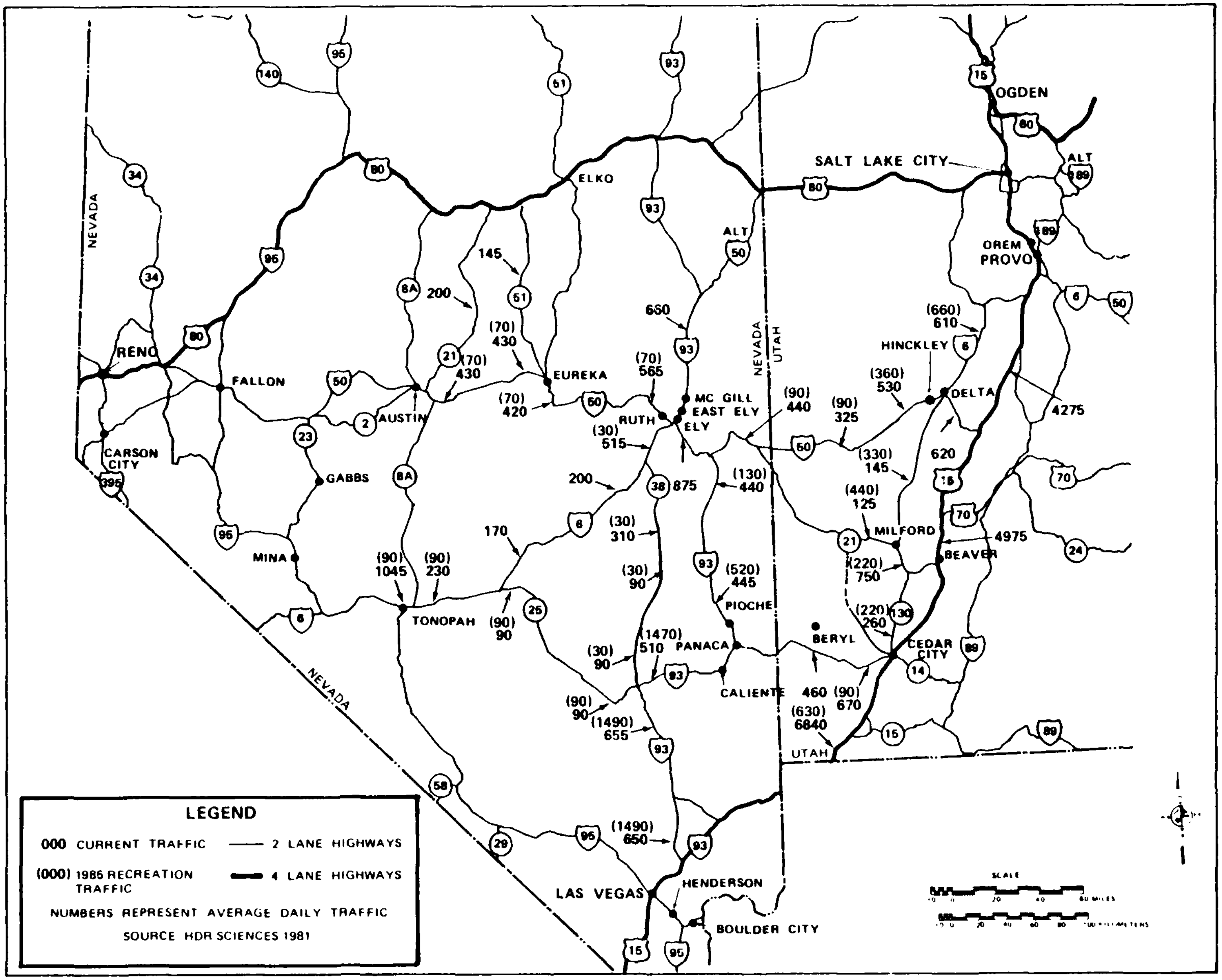

Figure 4.1-13. Projected recreation traffic by construction and A&CO personnel living in construction camps in 1985 for Alternative 8, split basing.

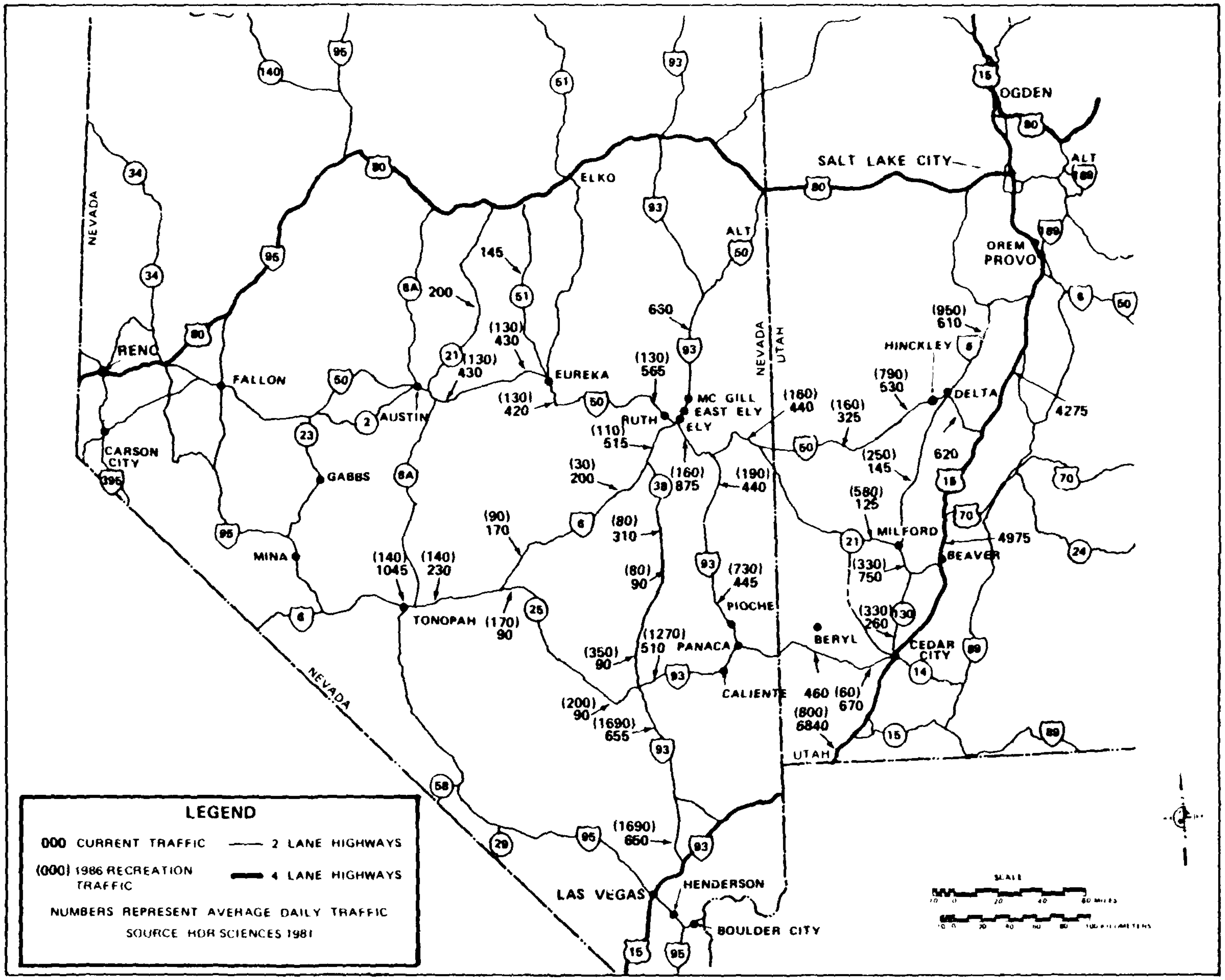

Figure 4.1-14. Projected recreation traffic by construction and A&CO personnel living in construction camps in 1986 for Alternative 8, split basing.

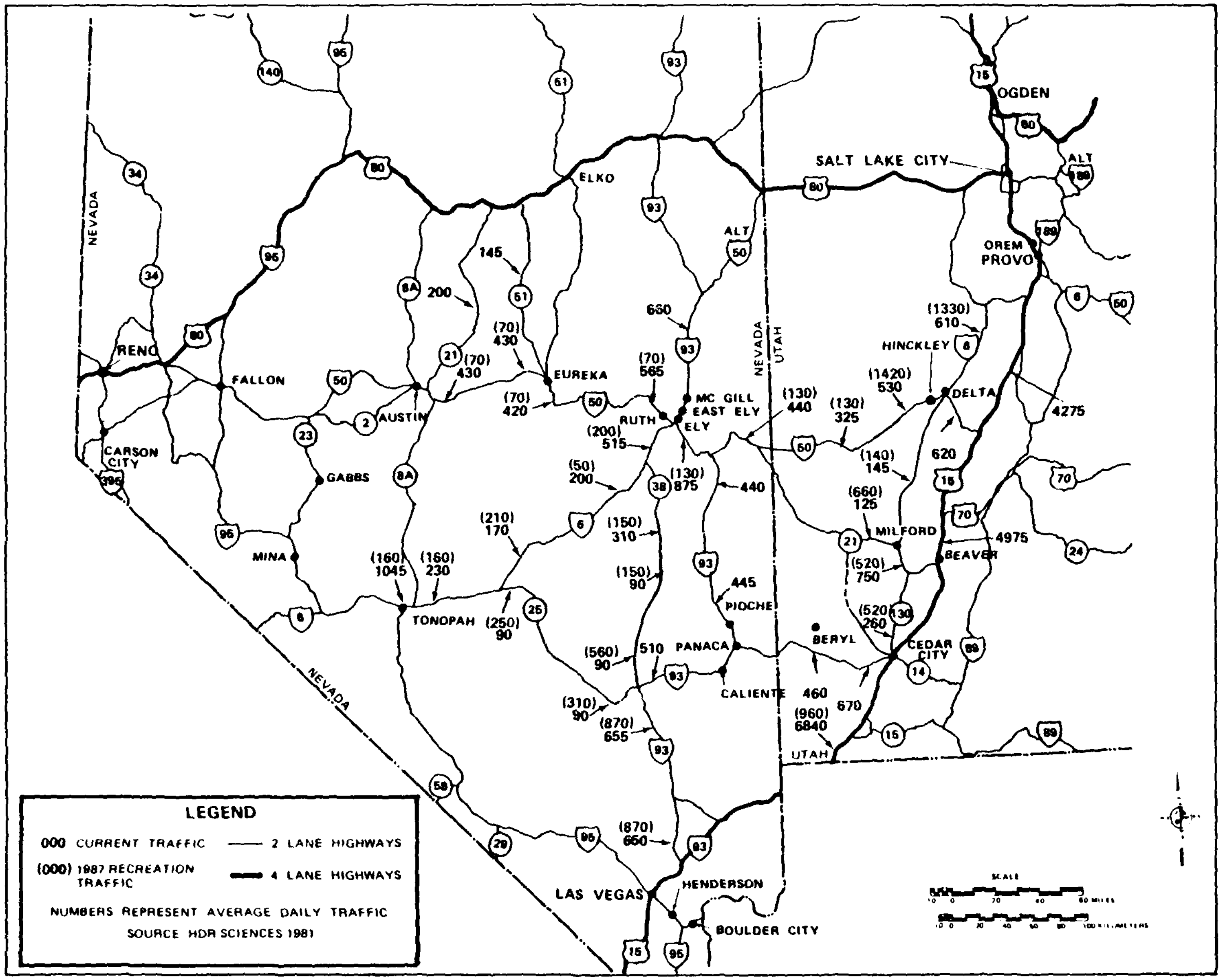

Figure 4.1-15. Projected recreation traffic by construction and A&CO personnel living in construction camps in 1987 for Alternative 8, split basing.

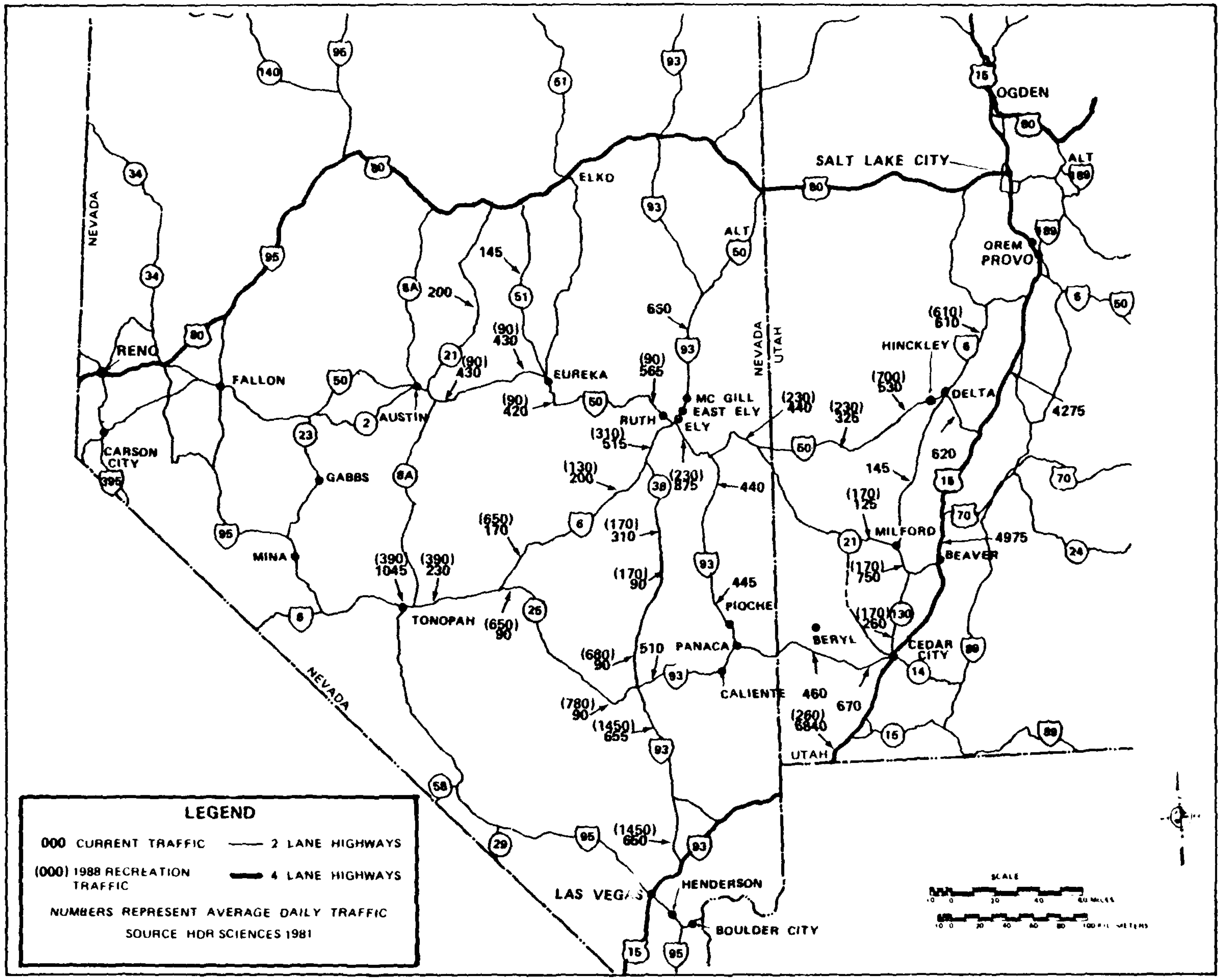

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Figure 4.1-15. Projected recreation traffic by construction and A&CO personnel living in construction camps in 1988 for Alternative 8, split basing.

would likely strain the existing road system, with road capacity being exceeded at critical intersections and along major streets. Congestion would result at these locations, especially during peak periods. Undoubtedly some traffic improvements, even if temporary, would have to be made during this period. However, once the construction period was over, the traffic would subside to the levels anticipated for the long-term operations phase which would be only slightly higher than current levels.

On the other hand, if the road system was expanded to the extent necessary to accommodate the short-term traffic levels, then traffic would flow smoothly, but the cost of expanding the road system would be a major impact on local governments. Once the short-term effect was over, the road system would be more than adequate to accommodate the long-term traffic levels. In either case, the short-term impacts associated with increases in traffic would be significant. For a discussion of the amount of in-migration anticipated, refer to the EIS and ETR-37 (Population).

Some missile components would be constructed in California and Utah and shipped to the bases over existing roads in vehicles that will exceed current weight and size limits. Permits to ship these components will be required. Shipping oversize loads is common practice and the permitting process ensures that oversize loads are handled in a manner that does not damage the roadways, present safety problems, or significantly disrupt the normal flow of traffic.

MAINTENANCE (4.1.3)

The increase in traffic on the existing road system would likely increase the maintenance requirements. This would be especially true during the construction phase when supply trucks and construction vehicles would be using the existing roads. This traffic could cause rapid deterioration of existing roads unless preventative measures are implemented. The amount of additional maintenance required would vary for each segment of road and would depend upon such factors as the quality of the existing road, the number of heavy trucks that would use the road, and current maintenance practices. In some cases, existing roads may have to be entirely reconstructed in order to accommodate a large number of trucks. These cases will be identified during subsequent tiered decisionmaking.

Comments on the draft indicate this is a major issue, both in the magnitude of the impacts and in the financial implications to state and local governments. The concern was expressed by the Governor of Nevada, but it also typifies concerns of other state and local agencies. ". . . The existing road system will have to be used to deliver equipment and supplies to the construction sites. The major portions of the existing roads were designed and constructed to accommodate minimal truck traffic. A major increase in truck traffic, even for a short period, will destroy the structural integrity of the existing roadbed surfacing. Again, this would create a tremendous financial impact to the State Department of Transportation . . ." (B0182-6-385).

During the operations phase the volume of M-X-generated traffic that would use the existing road system within the DDA would be very small, averaging only a few vehicles per day. The movement of missile components would be confined to the DTN which would not affect traffic on the existing roads.

The impacts due to truck traffic could be substantially reduced through implementation of effective mitigation measures such as encouraging trucks to use project roads. These are discussed in Section 5 of this ETR.

4.2 TEXAS/NEW MEXICO DEPLOYMENT AREA

The major impact of M-X system deployment on the road system within the Texas/New Mexico region would be increases in traffic levels. Construction of project roads would not significantly increase accessibility within the region since the existing road system is extensive and provides good access to most areas. The overall impacts would be similar to those in Nevada/Utah. Refer to Section 4.1 for a general discussion of impacts.

ACCESSIBILITY (4.2.1)

Construction of the M-X system would bring some long-term benefits to the region since all of the newly constructed roads would be available for use by the public, including the DTN which would be a good quality paved facility. New roads constructed on the same alignment as existing unsurfaced roads would experience short-term interruptions that would cause delays or detouring of existing traffic but it would not be significant due to the very low volume of traffic on those roads. On the other hand, the long-term improvements would be an asset to the area.

TRAFFIC (4.2.2)

The major traffic impacts on the existing road system would occur during the construction phase. Most of the construction traffic would utilize the newly constructed DTN and/or cluster roads precluding, to a large degree, conflicts with traffic on existing highways. Consequently, the major traffic effects on existing roads would be caused by trucks delivering materials and supplies and by construction workers. Those living in neighboring communities would commute to the construction areas, and those that reside at the construction camps would make recreation trips. This traffic would generally use the existing roads. Analysis shows the volume of this traffic to be fairly low. It is low enough so that even when combined with the existing traffic, it would be accommodated by the existing highway network. Traffic increases on various routes range from up to approximately 2,000 vehicles per day, well under the 10,000 vehicles per day capacity of the two-lane facilities over which most of this traffic would flow. During peak periods, however, congestion on some routes near the construction camps would likely occur causing delay and inconvenience to motorists. The impacts would be short-term, however, since each of the camps would be in operation for only three to five years and would be at peak population for only about one year.

The construction workers not living in the construction camps would make daily commute trips from neighboring communities. The anticipated daily commute trips along with current daily traffic volumes are shown on Figures 4.2-1 through 4.2-4. The numbers represent the average daily commute traffic over an entire year that is expected for each segment of highway during each of the construction years 1985 through 1988. During peak summer months, traffic could be as much as 35 percent higher, but during winter months traffic would be correspondingly less.

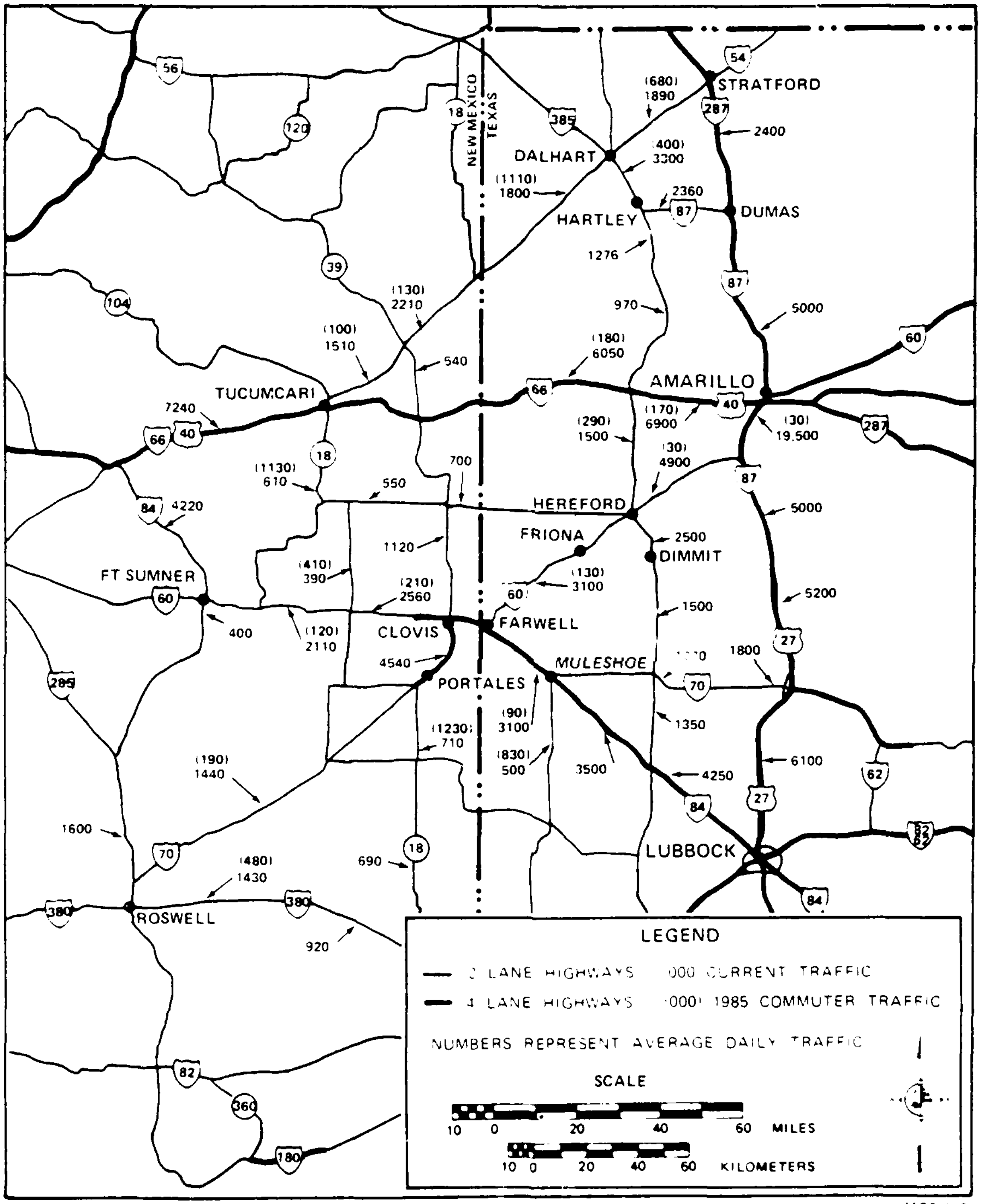

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Figure 4.2-1. Projected daily commute traffic by construction and A&CO personnel in 1985 for Alternative 7.

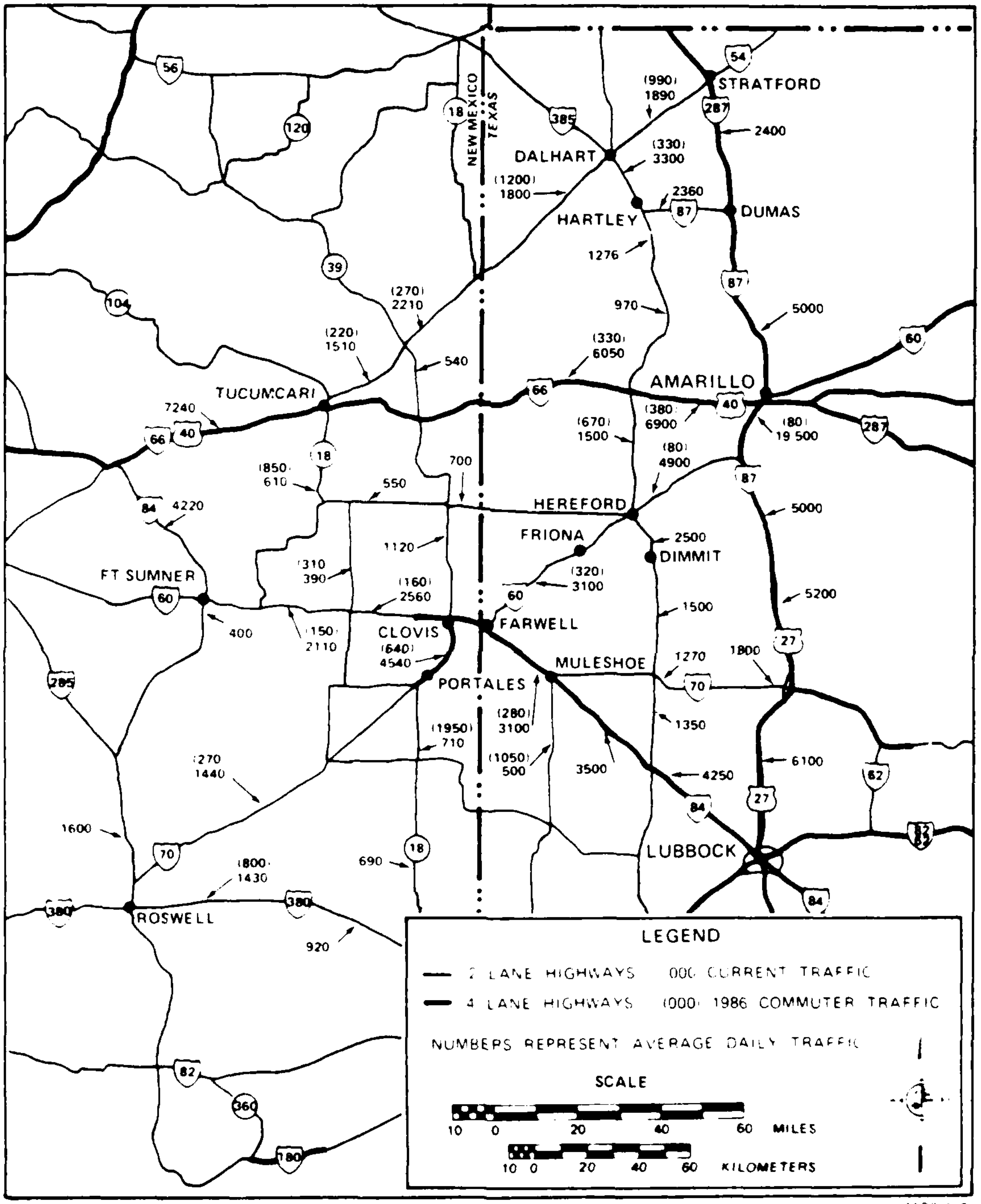

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Figure 4.2-2. Projected daily commute traffic by construction and A&CO personnel in 1986 for Alternative 7.

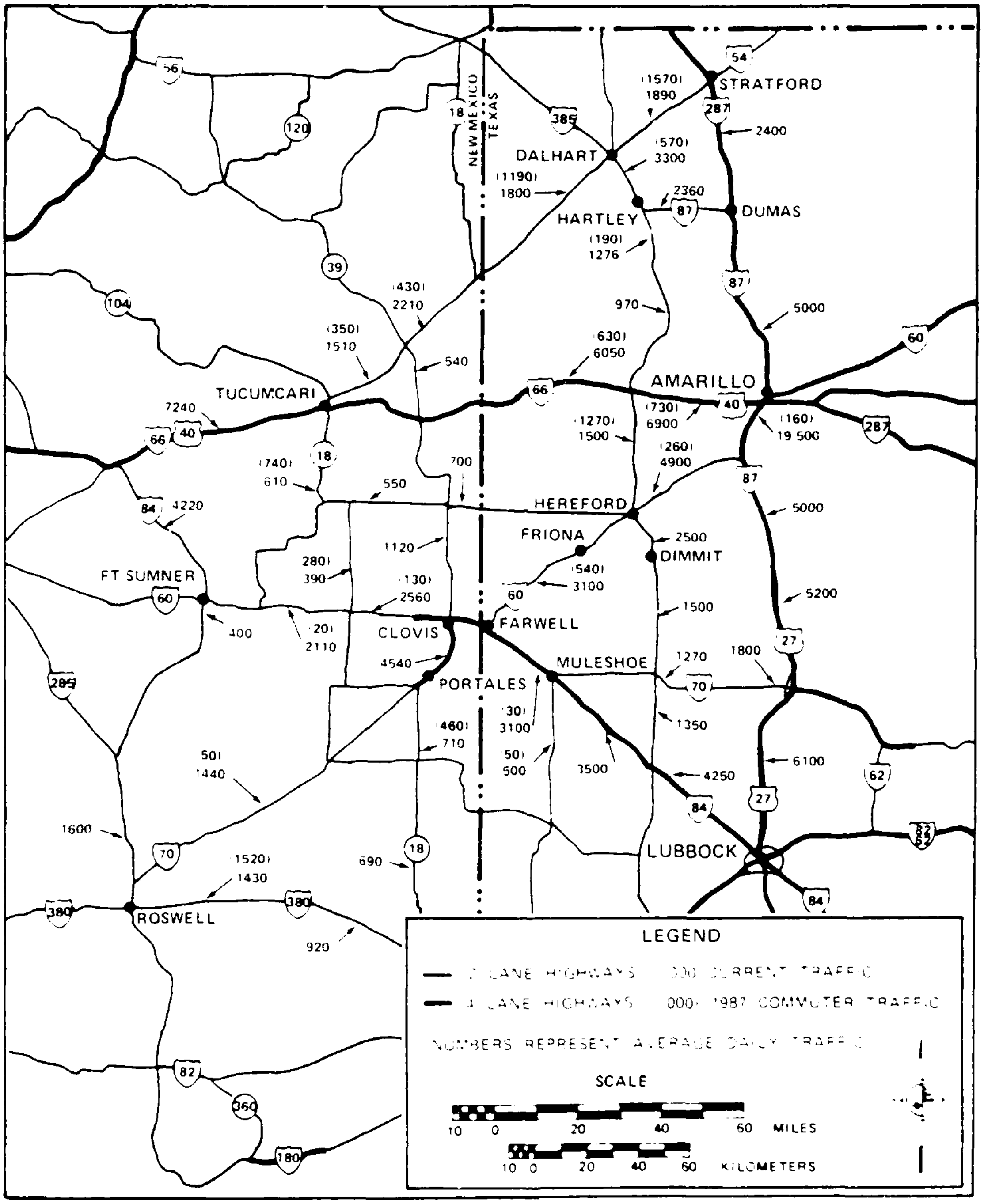

Figure 4.2-3. Projected daily commute traffic by construction and A&CO personnel in 1987 for Alternative 7.

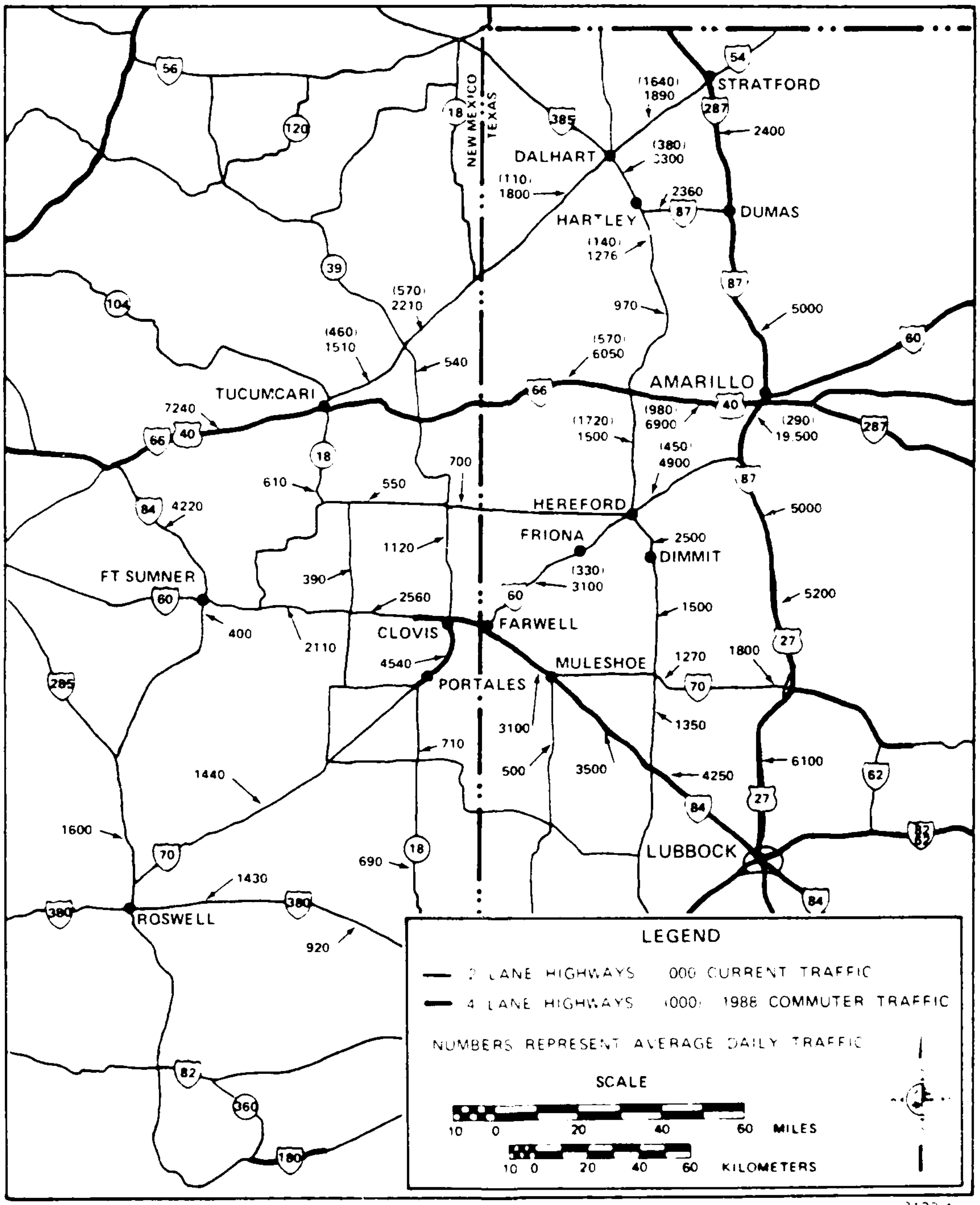

Figure 4.2-4. Projected daily commute traffic by construction and A&CO personnel in 1988 for Alternative 7.

All of the construction workers living at the construction camps are expected to make recreation trips during the course of the project. These would principally occur on weekends or during shift changes and not on a daily basis. Figures 4.2-5 through 4.2-8 show the anticipated recreation trips for the years 1985 through 1988, the years during which the greatest amount of construction activity would occur.

The two lane roads in the region would be most affected by the anticipated increases in traffic. Those that would experience increases in commute traffic of 1,000 vehicles per day or more are the following:

Texas

U.S. 54 north and west of Dalhart in 1986 through 1988.

State Route 214 south of Muleshoe in 1986.

New Mexico

State Route 18 south of Tucumcari in 1985 and south of Portales in 1986.

Traffic increases in excess of 1,000 vehicles per day is used to identify two-lane roads likely to experience significant traffic problems as a result of M-X-related traffic. Assuming the additional traffic would occur primarily within the morning and afternoon peak periods, an increase of 500 vehicles per hour would cause a reduction in level of service and may exceed capacity. Capacities of these roads is at least 5,000 vehicles per day except through the mountain passes discussed earlier. Therefore, if M-X-related traffic is spread throughout the day rather than concentrated during peak periods, the existing capacity should be able to accommodate the traffic. Staggered work shifts to reduce peak traffic or the use of buses to reduce the number of vehicles could mitigate potential traffic problems. Without these mitigations however, peak commute traffic is likely to exceed capacity on some or all of these routes. Congestion and delays to motorists would result at those times. Mitigations are discussed in Section 5 and in ETR-38 (Mitigations).

Capacity is not normally used as a design criterion for designing or improving roads. For rural roads level of service "B" or "C" is usually used for design purposes. However, when only short term increases in traffic are expected, lower Levels of Service are often tolerated when the long-term needs are much less than the short-term needs. This would be the case for most of the roads in the vicinity of M-X facilities except the operating bases. The specific road improvements and Levels of Service that would be required for nonproject roads will be identified after the final siting and design of M-X facilities. In order to mitigate the impacts on existing roads and to identify transportation requirements for both the short term and long term, the Air Force will coordinate transportation planning with federal, state, and local transportation agencies. These and other mitigations are discussed in Section 5 and in ETR-38 (Mitigations).

Some of the four-lane roads in the region also would have traffic increases in excess of 1,000 vehicles per day, such as U.S. 70 between Clovis and Portales and, I-17 north and south of Amarillo, but the existing roads should be able to accommodate the traffic.

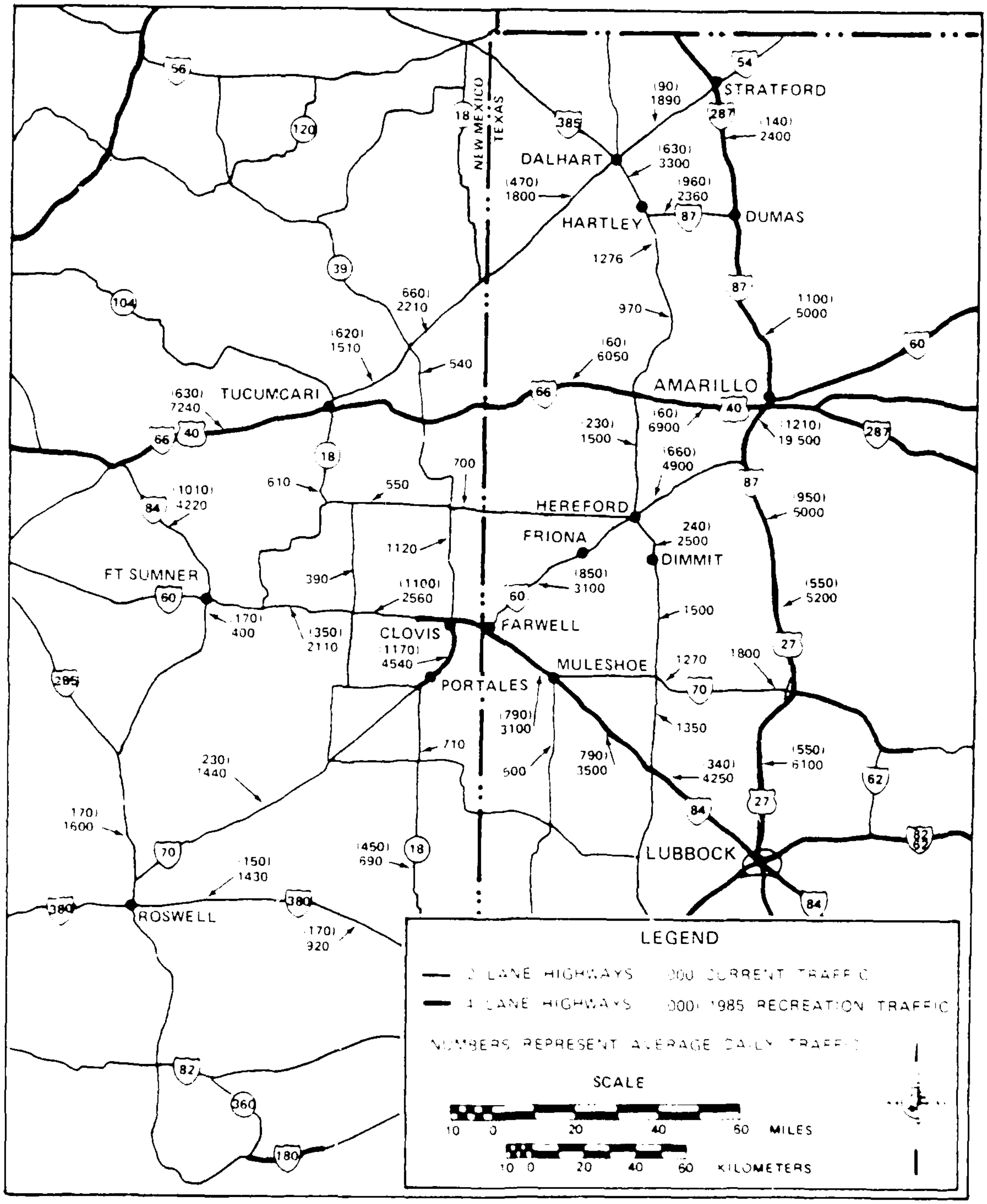

Figure 4.2-5. Projected recreation traffic for construction and A&CO personnel living in construction camps in 1985 for Alternative 7.

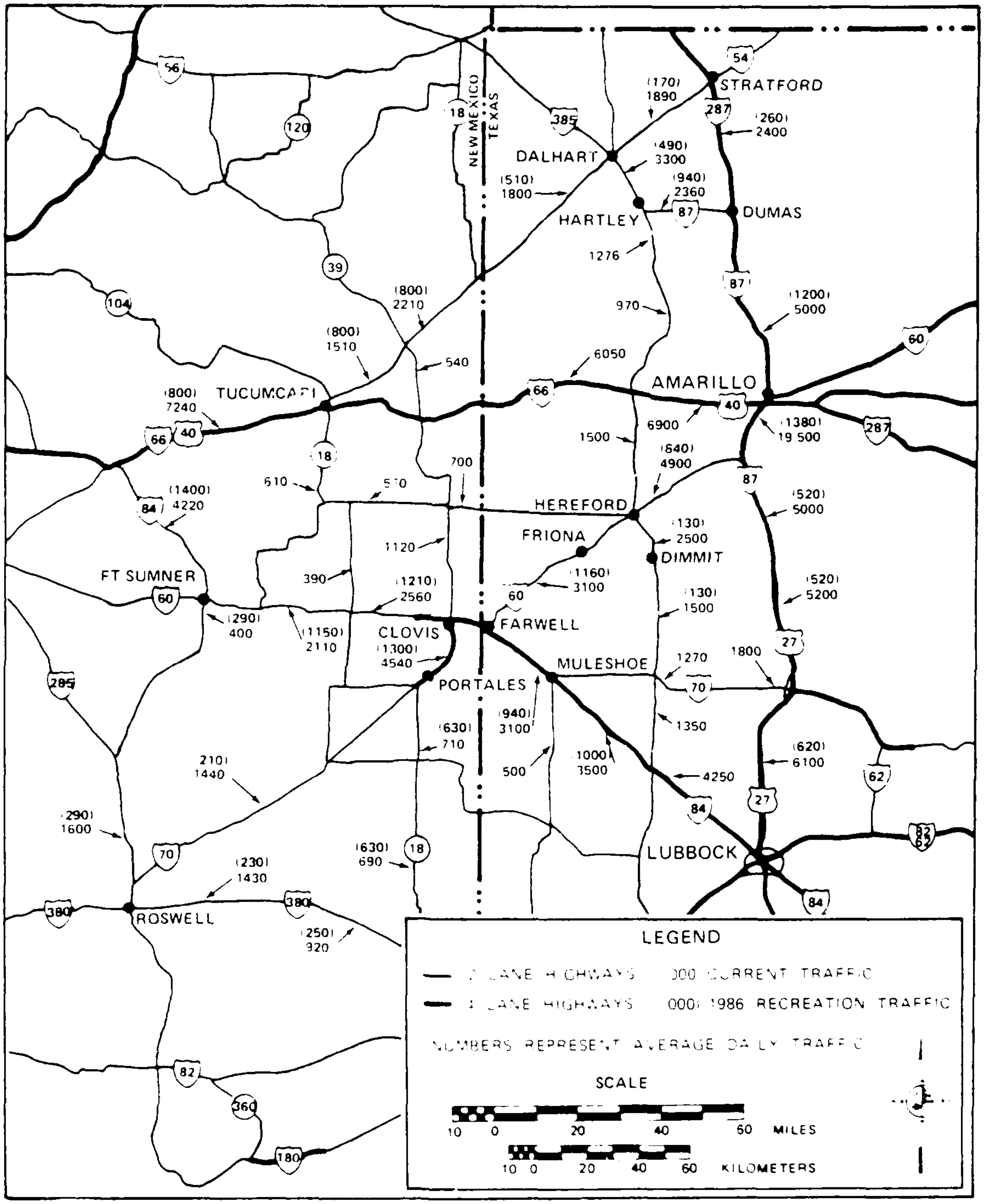

Figure 4.2-6. Projected recreation traffic for construction and A&CO personnel living in construction camps in 1986 for Alternative 7.

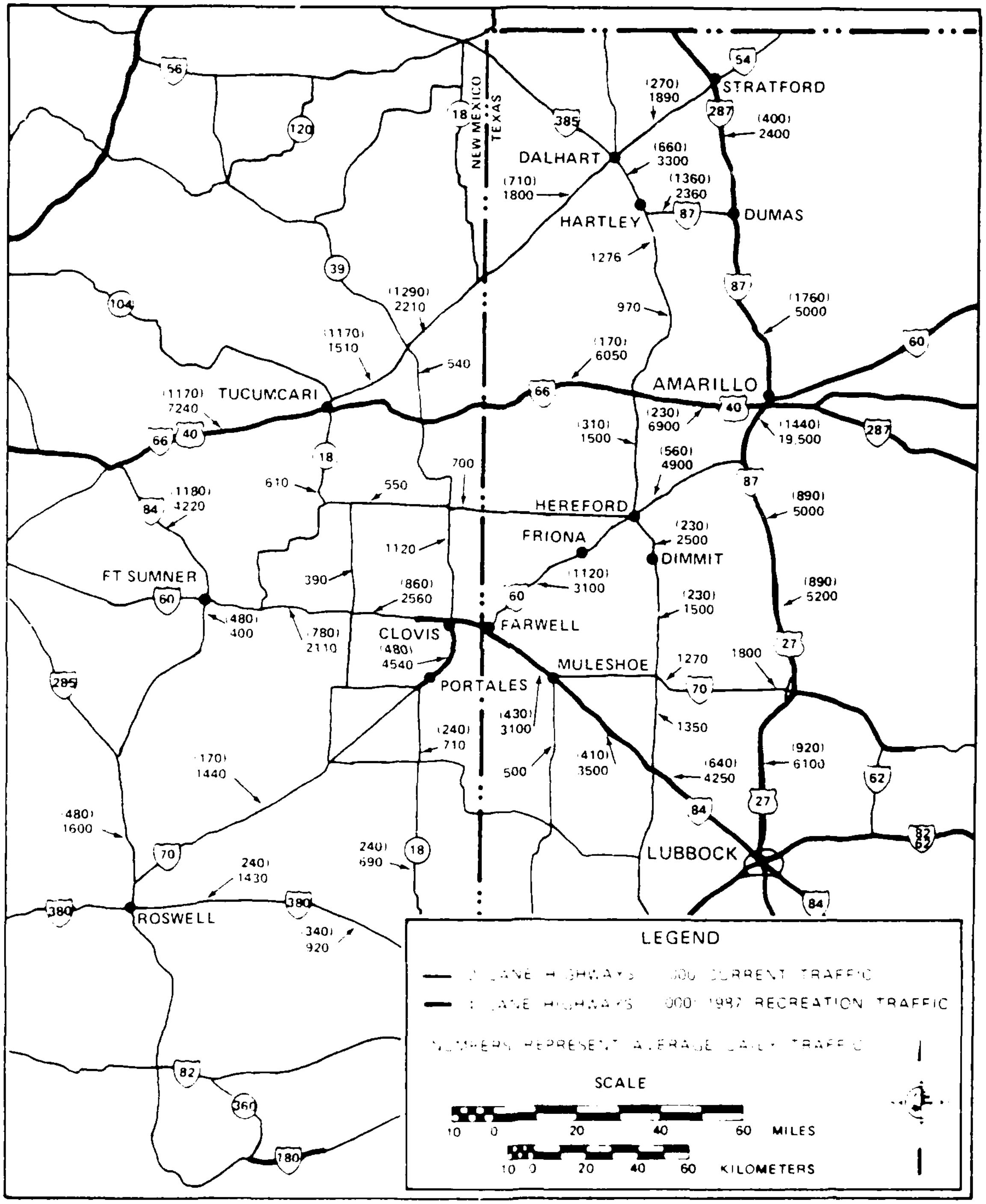

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Figure 4.2-7. Projected recreation traffic for construction and A&CO personnel living in construction camps in 1987 for Alternative 7.

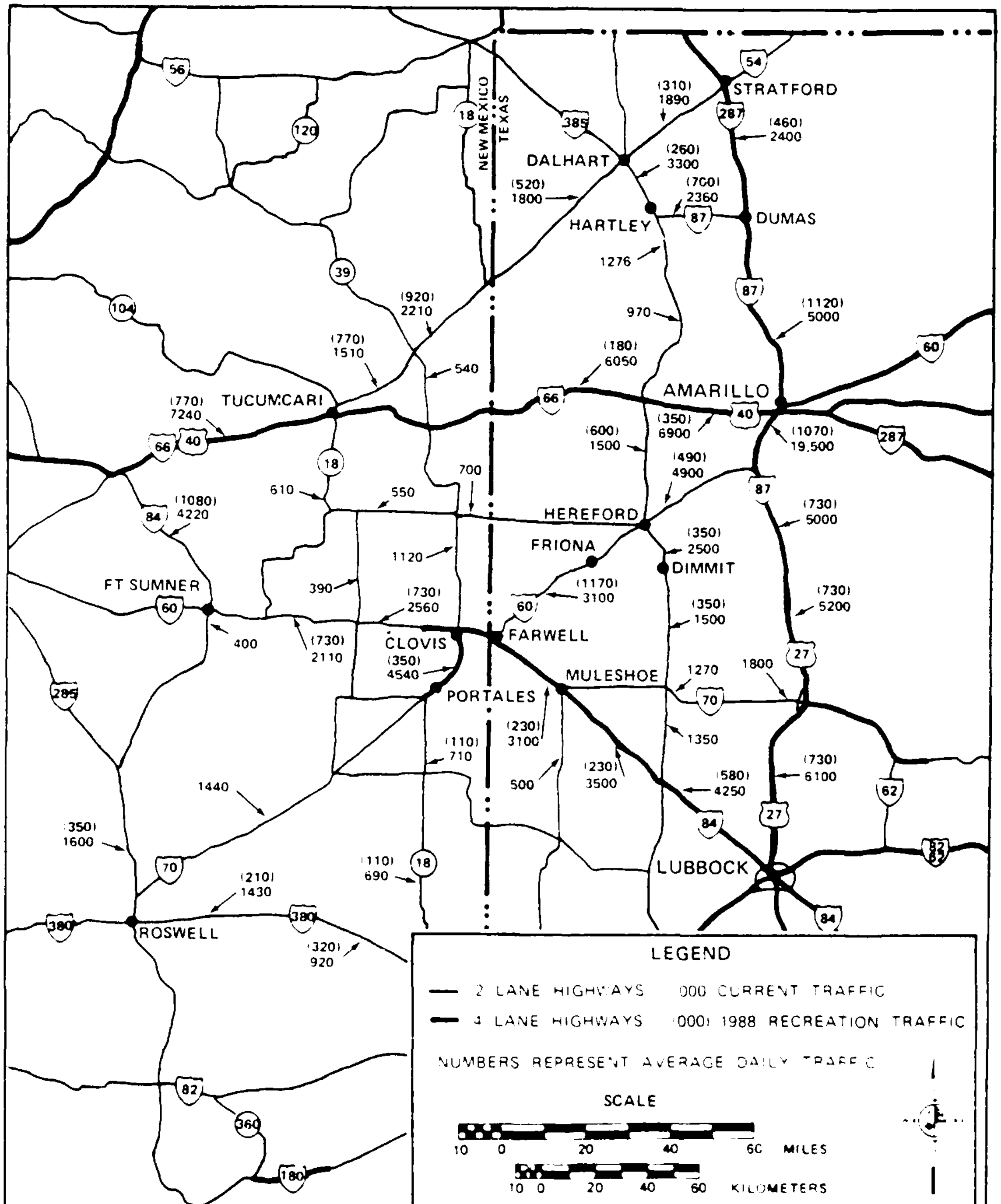

Figure 4.2-8. Projected recreation traffic for construction and A&CO personnel living in construction camps in 1988 for Alternative 7.

Numerous other county roads in the area would also experience increases in traffic, especially those that connect construction camps to existing state and federal highways.

Construction traffic would primarily use the DTN and cluster roads. It would vary from year to year and from area to area throughout the construction period. The peak traffic would be in the immediate vicinity of each of the construction camps along the DTN. The volume and timing would depend upon the size and scheduling operation.

Some conflicts would occur between construction traffic and current highway traffic at points where the DTN and cluster roads cross or coexist with existing roads (Table 4.2-1). Construction traffic in the DTN near the construction camps would vary from 2,500 to 4,400 vehicles per day during the peak year for each of the camps. While there would be a large number of these intersections the actual effects on traffic should be small since a grade separation would be constructed at all points where the DTN crosses an existing route with average daily traffic over 500 vehicles, assuming the grade separations are constructed in time for construction traffic use. Moreover, cluster roads are specifically designed to avoid crossing or coexisting with any road that has average daily traffic over 250 vehicles. At some of the locations where intersections would exist there would be localized short-term delay to some motorists due to the crossing of construction vehicles. Localized improvements would be made where necessary to ensure safety and an orderly flow of traffic. These locations would be identified on a case by case basis and site-specific improvements would be made. This may include installation of signs or signals, or the temporary use of flagmen.

For Alternative 8, only half of the system would be constructed in Texas/New Mexico, therefore only half the total traffic would be generated. Concentrations of traffic near each of the construction camps would be high, but since the camps would be more spread out than with the full system, impacts would be considerably less. Figures 4.2-9 through 4.2-12 show the anticipated commute traffic for the split system, and Figures 4.2-13 through 4.2-16 show the anticipated recreation traffic.

The communities within the study region would almost all experience some increase in traffic to the highways passing through them but these increases would amount to approximately 2,000 vehicles per day or less. This magnitude of increase would not significantly affect the majority of Texas/New Mexico communities within the study region, although some short-term traffic problems may occur. The towns of Dimmitt and Hereford are possible exceptions. Additional traffic on U.S. 385 through these communities anticipated for Alternative 7 may require some localized roadway improvements such as short segments of widening to ensure that traffic is adequately accommodated. For Alternative 8 no traffic impacts are anticipated for these communities, other than those caused by the temporary influx of population into the communities. These impacts would be similar to those discussed for Nevada/Utah. Refer to Section 4.1.2 for a discussion of impacts to communities.

During the operations phase the volume of M-X-generated traffic that would use the existing road system within the DDA would be very small, averaging only a few vehicles per day. The movement of missile components would be confined to the DTN which would not affect traffic on the existing roads.

Table 4.2-1. Intersections between proposed project roads and existing roads and railroads - Texas/New Mexico.[1]

Alternative	Intersections With Existing Roads: DTN Federal or State	DTN Paved	DTN Other	Cluster Roads[2] Paved	Cluster Roads[2] Other	Intersections With Railroads and the DTN[3]
7 (Full Basing)	26	66	394	173	2,100	16
8 (Split Basing)	18	51	214	96	1,276	10

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[1]At all intersections with state and federal routes, county roads with average daily traffic over 500 vehicles per day and all railroad crossings, overpasses will be constructed.

[2]Cluster roads are specifically designed not to intersect with any road that has an average daily traffic over 250 vehicles per day.

[3]Cluster roads will not cross railroads.

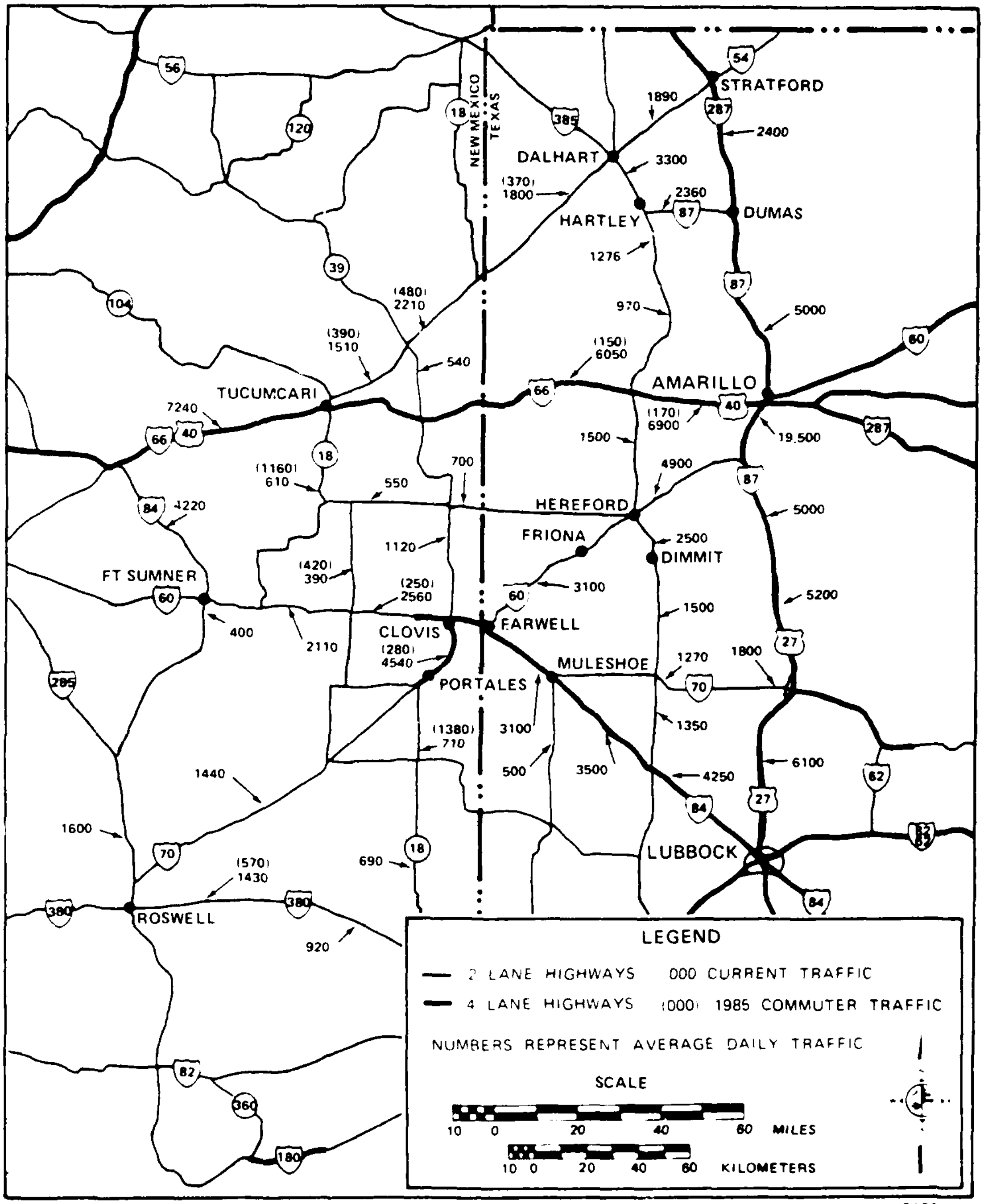

Figure 4.2-9. Projected daily commute traffic by construction and A&CO personnel in 1985 for Alternative 8, Split Basing.

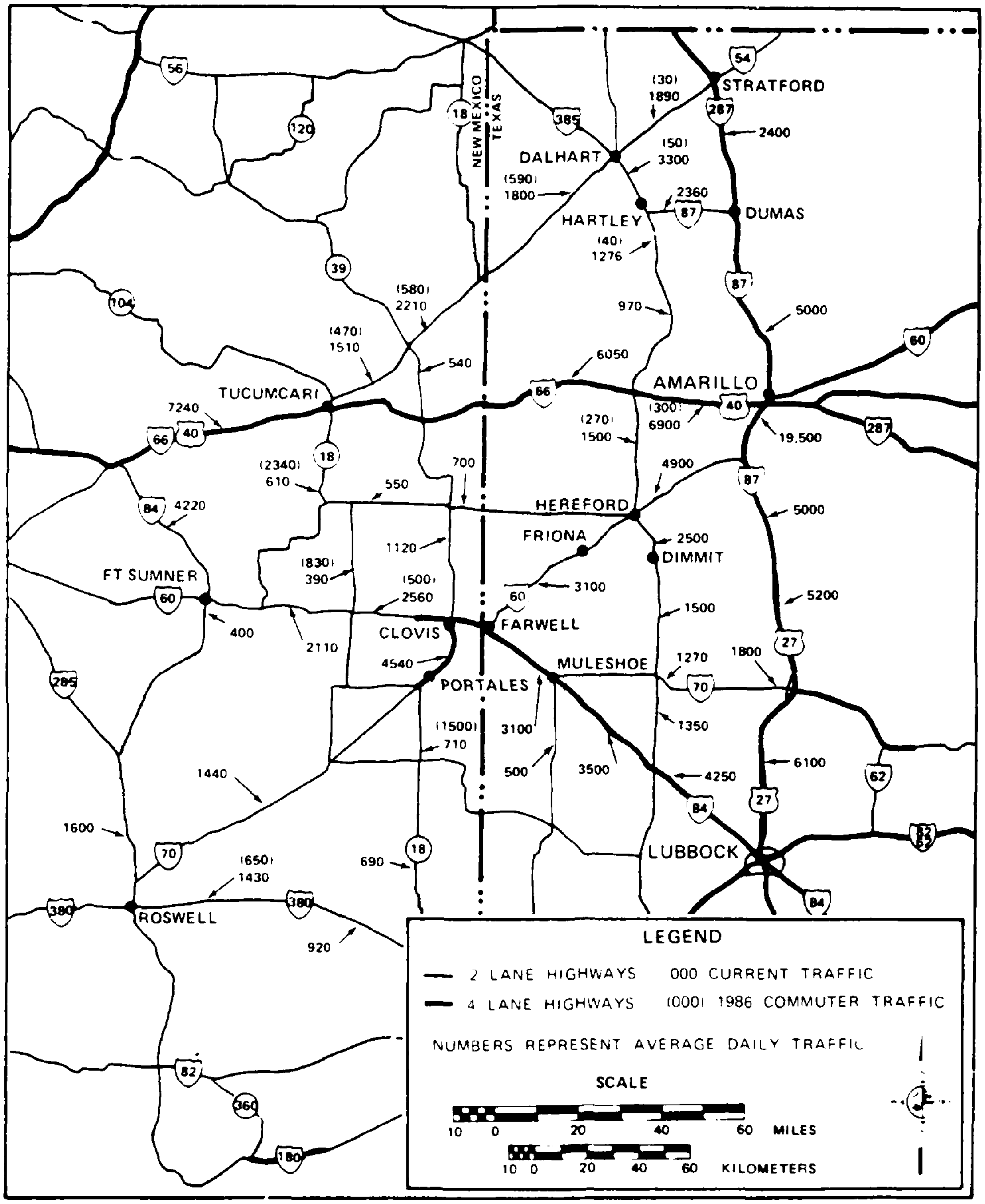

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Figure 4.2-10. Projected daily commute traffic by construction and A&CO personnel in 1986 for Alternative 8, Split Basing.

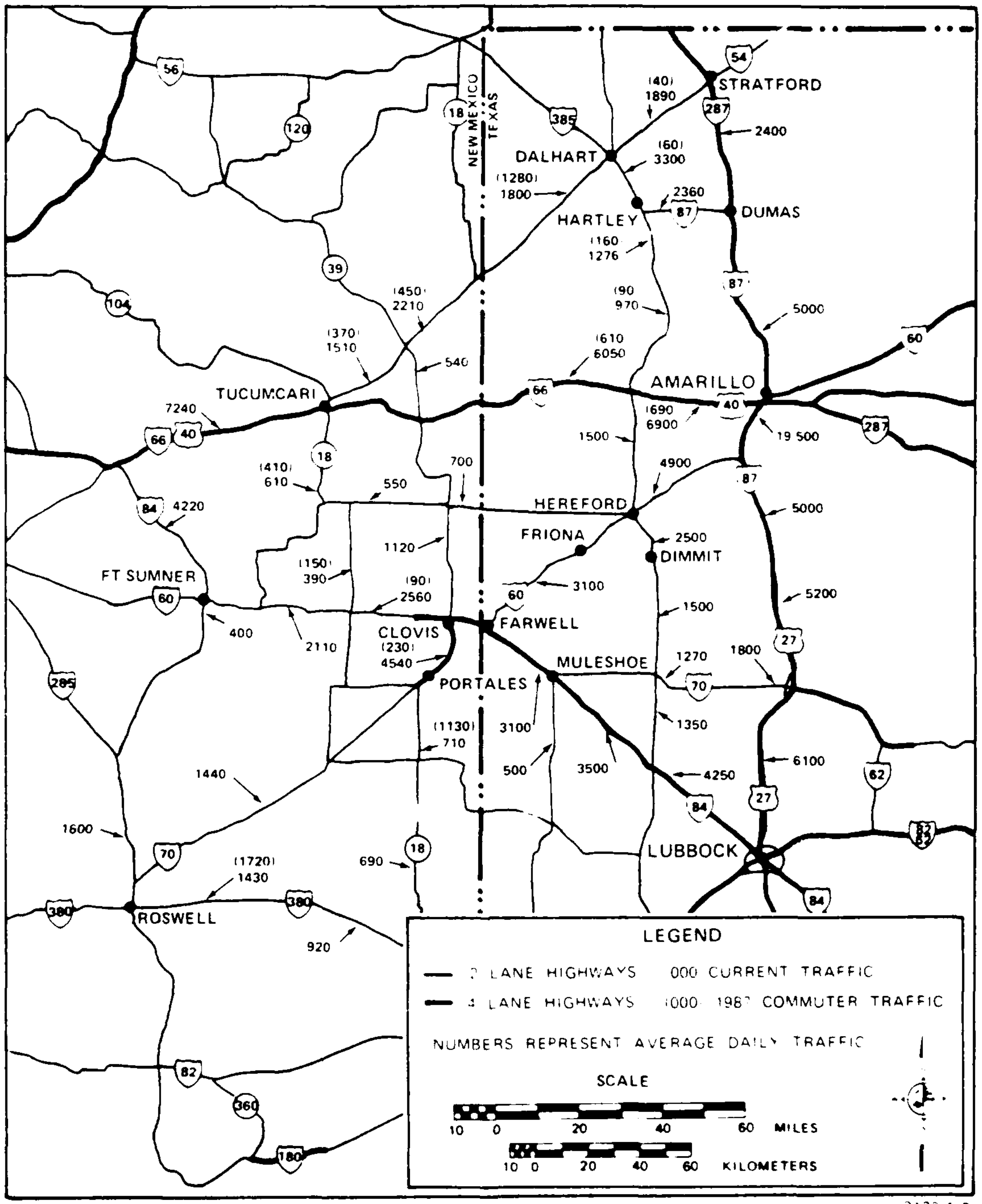

Figure 4.2-11. Projected daily commute traffic by construction and A&CO personnel in 1987 for Alternative 8, Split Basing.

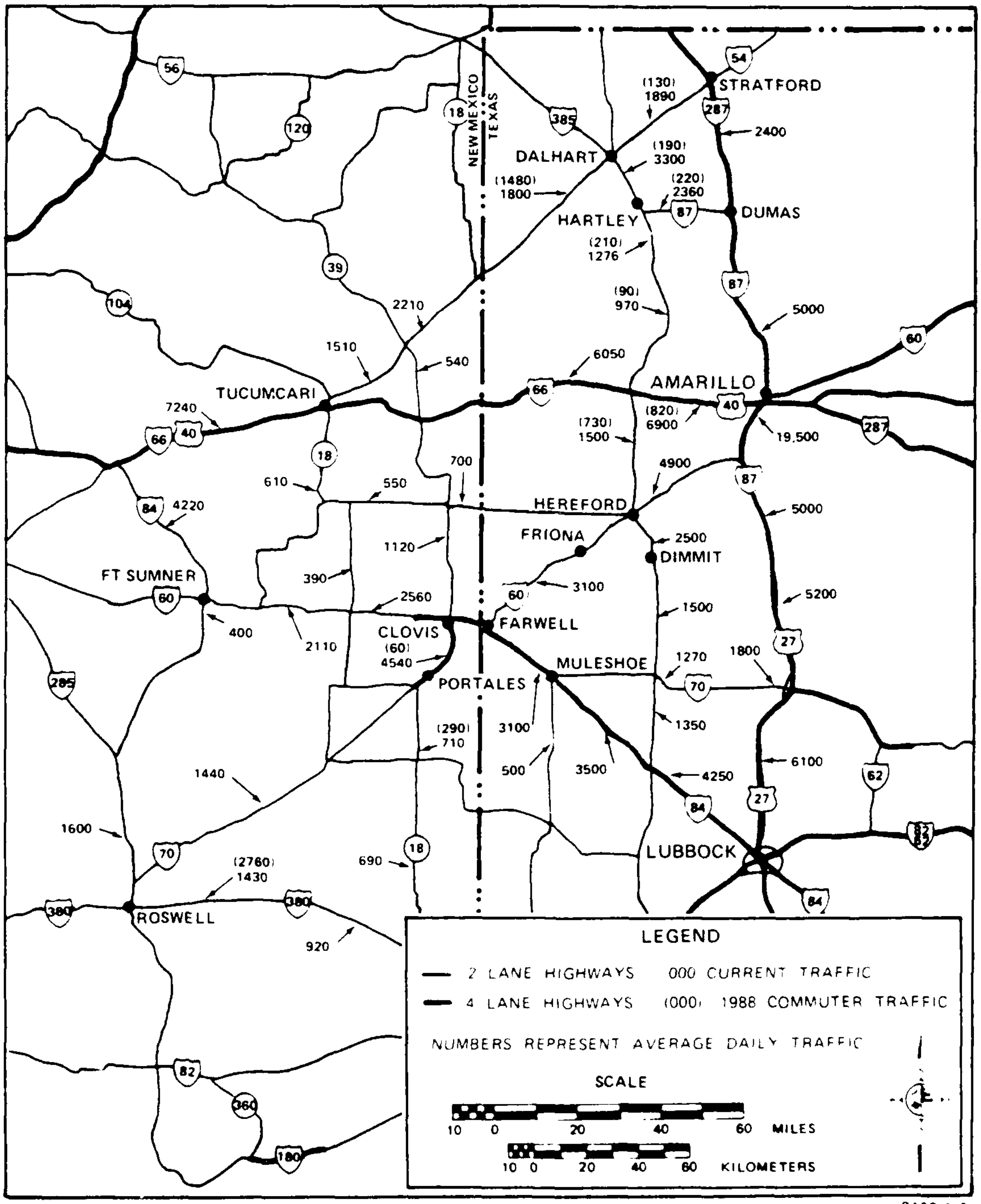

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Figure 4.2-12. Projected daily commute traffic by construction and A&CO personnel in 1988 for Alternative 8, Split Basing.

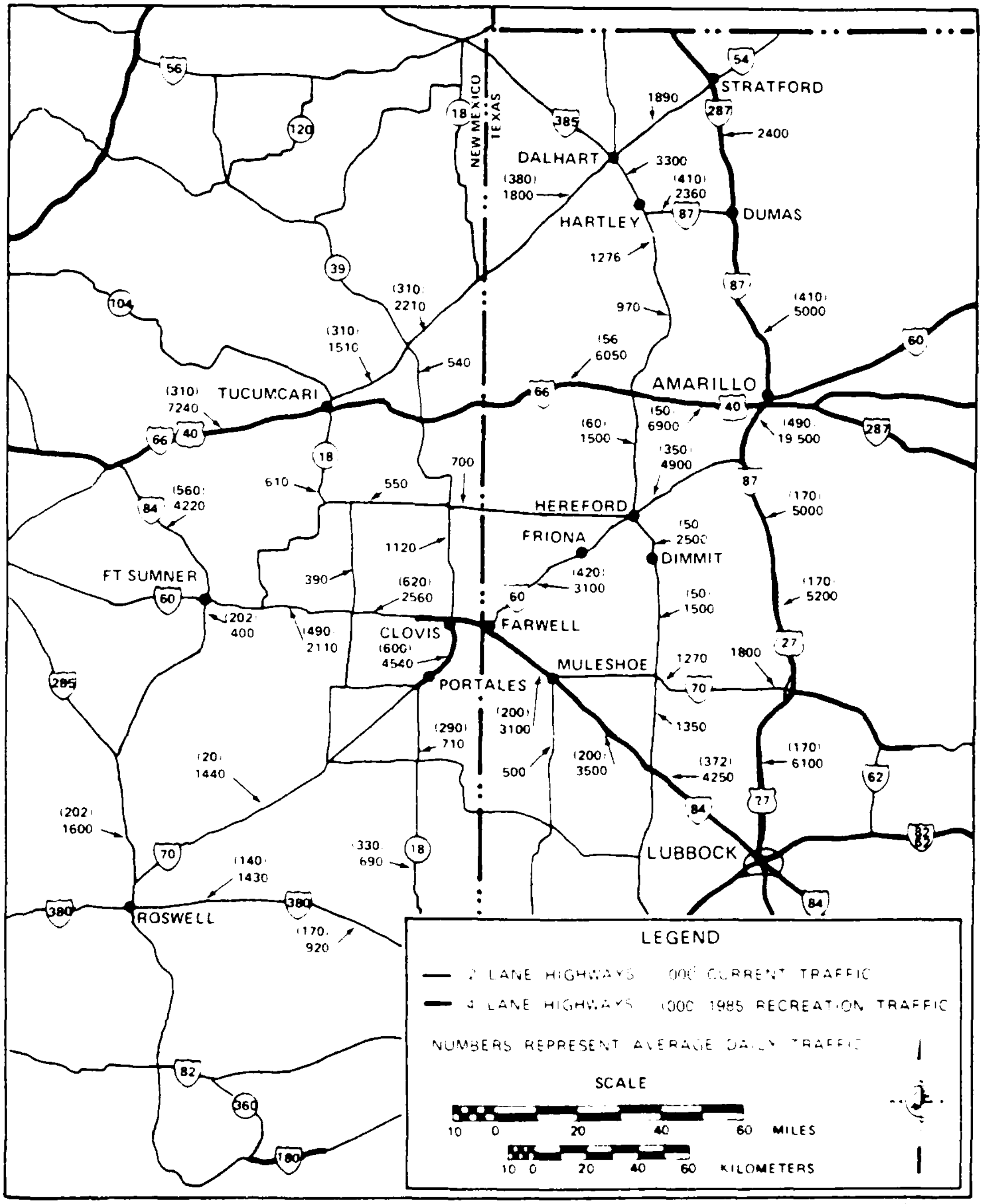

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Figure 4.2-13. Projected recreation traffic for construction and A&CO personnel living in construction camps in 1985 for Alternative 8, Split Basing.

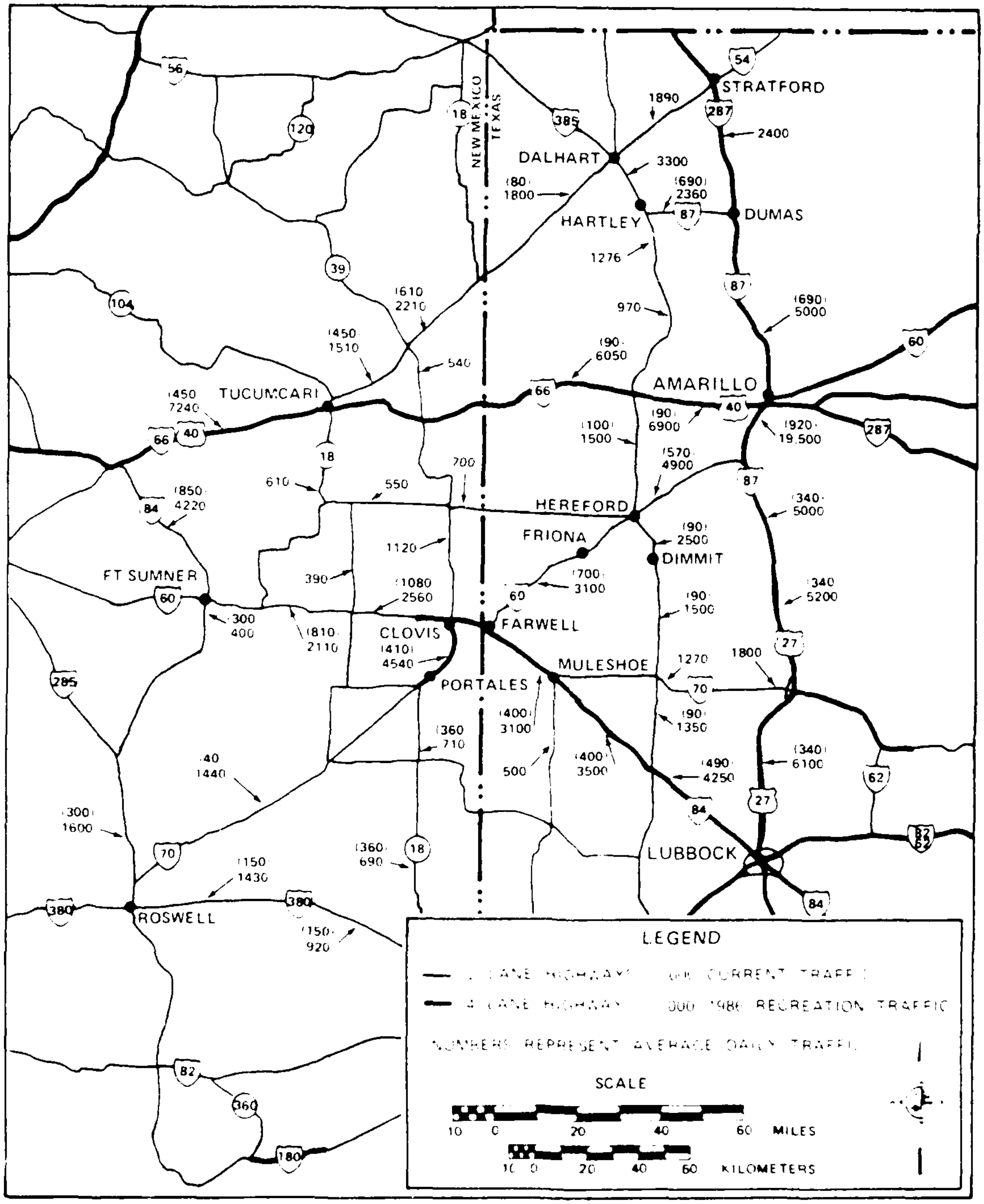

Figure 4.2-14. Projected recreation traffic for construction and A&CO personnel living in construction camps in 1986 for Alternative 8, Split Basing.

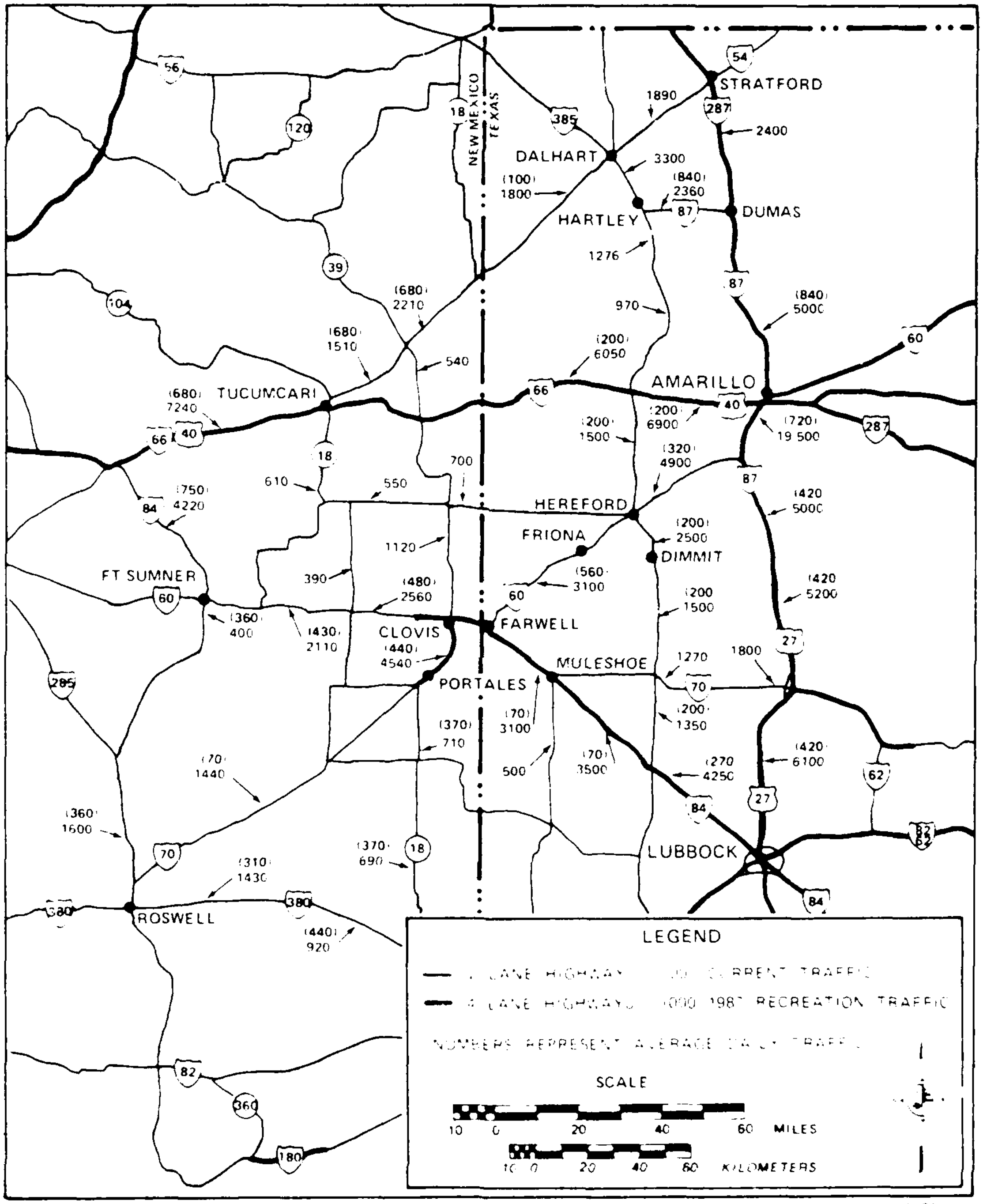

Figure 4.2-15. Projected recreation traffic for construction and A&CO personnel living in construction camps in 1987 for Alternative 8, Split Basing.

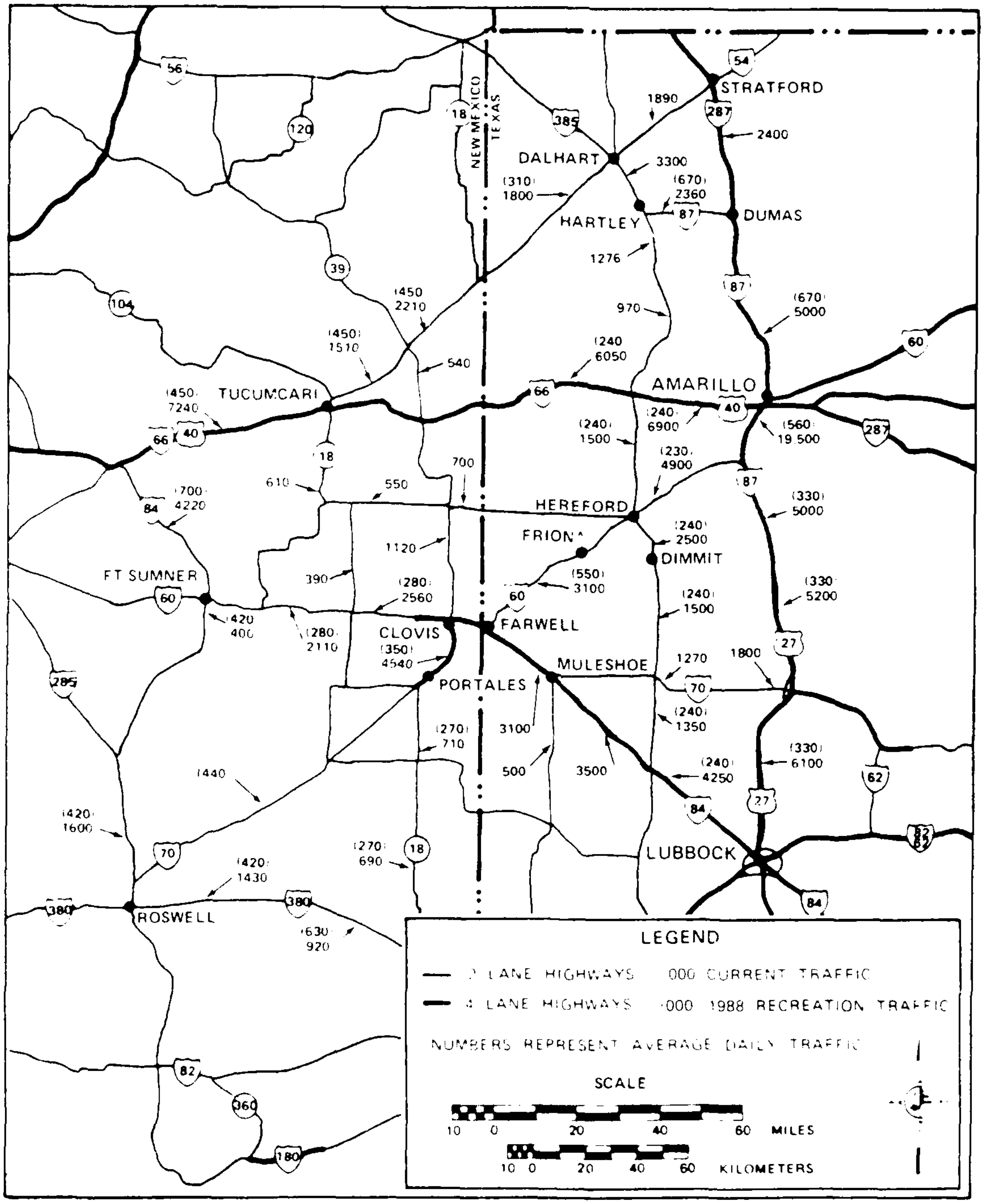

Figure 4.2-16. Projected recreation traffic for construction and A&CO personnel living in construction camps in 1988 for Alternative 8, Split Basing.

MAINTENANCE (4.2.3)

The increase in traffic on the existing road system would likely increase the maintenance requirements. This would be especially true during the construction phase when supply trucks would be using the existing roads. This traffic could cause rapid deterioration of existing roads unless preventive measures are implemented. The amount of additional maintenance required would vary for each segment of road and would depend upon such factors as the quality of the existing road, the number of heavy trucks that would use the road, and current maintenance practices. In some cases, existing roads may have to be entirely reconstructed in order to accommodate a large number of trucks. These areas will be identified during subsequent tiered decisionmaking.

The concern over who would be responsible for the additional maintenance is expressed many times in comments on the DEIS. A comment by the Eastern Plains Council of Governments is typical, " . . . There are existing roads in the area that currently are not adequate for heavy traffic vehicles. . . . Therefore, it should be recognized that many paved county roads will need improvements, and this should not be the responsibility of that respective county, but that of the federal government since the problems will be caused by the M-X Missile Project . . . " (B0569-2-005).

4.3 PROPOSED OPERATING BASE LOCATIONS

BERYL, UTAH (4.3.1)

The employment opportunities generated by construction and operation of an operating base near Beryl would result in a large influx of people into the area and a corresponding increase in traffic. This growth in traffic would develop within the base itself, on the adjacent road system, and in neighboring communities. Adverse impacts would occur when the growth in traffic would cause delay and inconvenience to motorists or when road improvements would be needed to accommodate the anticipated traffic.

The location and magnitude of the traffic impacts depend upon the specific location of offbase development. The amount of offbase development and the corresponding increases in traffic are dependent upon the number of military and civilian employees that move into the area and reside in communities near the base. Once the base is fully operational 20 percent of the military personnel and their dependents would live in communities near the base and commute to work, as would all of the civilian employees. In addition to the commute trips, the military personnel and their dependents would make additional trips to the base to take advantage of the shopping and other amenities provided on the base. Besides the population increases associated with direct employment opportunities, there would be additional in-migration to satisfy the indirectly generated employment opportunities. All of these people would be making numerous trips within the communities in which they reside. It is the total traffic generated by all in-migrants that cause the impacts.

For traffic analysis in this report, each new household was assumed to generate 10 trips, or one-way traffic movements, on an average day. These trips include all home based trips, including work trips, and nonhome based trips. When

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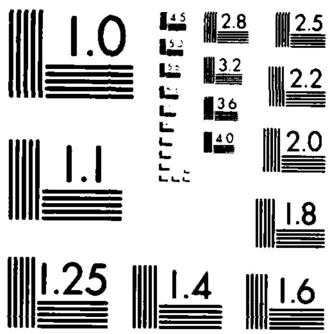


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

new M-X induced employment opportunities are satisfied by the indigenous population it is assumed that travel patterns would change to reflect travel to the new employment center, the operating base. A more detailed discussion of the methodology is contained in Section 6.

Each of the communities near the Beryl site, notably Cedar City, Enterprise, and Newcastle, is expected to have direct and indirect M-X-induced growth and corresponding increases in traffic. Traffic estimates in the vicinity of the operating base for a first and a second operating base at Beryl are presented in Figures 4.3.1-1 and 4.3.1-2, respectively. Estimates are included for future baseline traffic without the project, for M-X-related traffic, and for the total of the two. The year 1992 was used for the analysis since it represents the long-term steady-state condition that is expected to continue through the operational phase of the project.

State route 56 between Beryl Junction and Cedar City would experience a substantial increase in traffic. In order to accommodate the anticipated traffic, this route would have to be improved and widened to four lanes. This is true whether a first or second base is constructed at Beryl. The road between Beryl and Beryl Junction will have to carry the largest volume of traffic and will probably have to be improved and widened to four lanes also. If fewer operating base personnel choose to live in the Cedar City area than anticipated under this growth scenario, then widening of Route 56 may not be necessary. However, in that case, additional improvements to other roads may be required.

Almost 1,500 new households are anticipated in communities within Iron County as a result of in-migration to satisfy the employment opportunities created by the Proposed Action. This would generate nearly 15,000 new trips, or traffic movements, daily. New roads as well as new homes would have to be constructed to accommodate the growth. The communities of Newcastle and Enterprise would probably receive a large enough increase in traffic under either base scenario to strain the existing transportation infrastructure. Good planning and orderly development can prevent many traffic problems, but localized traffic problems requiring road improvements or modifications would probably be required on the existing street system. Specific impacts would depend upon where growth actually occurs and the number of persons who choose to reside in or near those communities. Cedar City is a larger community than Newcastle or Enterprise, and is less likely to have significant traffic problems attributable to the M-X-induced growth although some improvements would probably be required.

The traffic generated on the base would primarily stay on the base with only a small portion having offbase destinations. Therefore, this traffic would have no effect on the adjacent road system. The trips made to offbase destinations by base personnel have been included in the traffic estimates.

During the construction phase there would be a large temporary increase in population within the local communities. These would be the people participating in construction of the operating base, the Assembly and Check Out personnel, the people participating in construction of the facilities in the neighboring communities that will be necessary to accommodate the new permanent residents, and the support people for all of the temporary workers. All of these people would remain only a few years and by 1992 they would all have moved out of the area, leaving only the permanent residents.

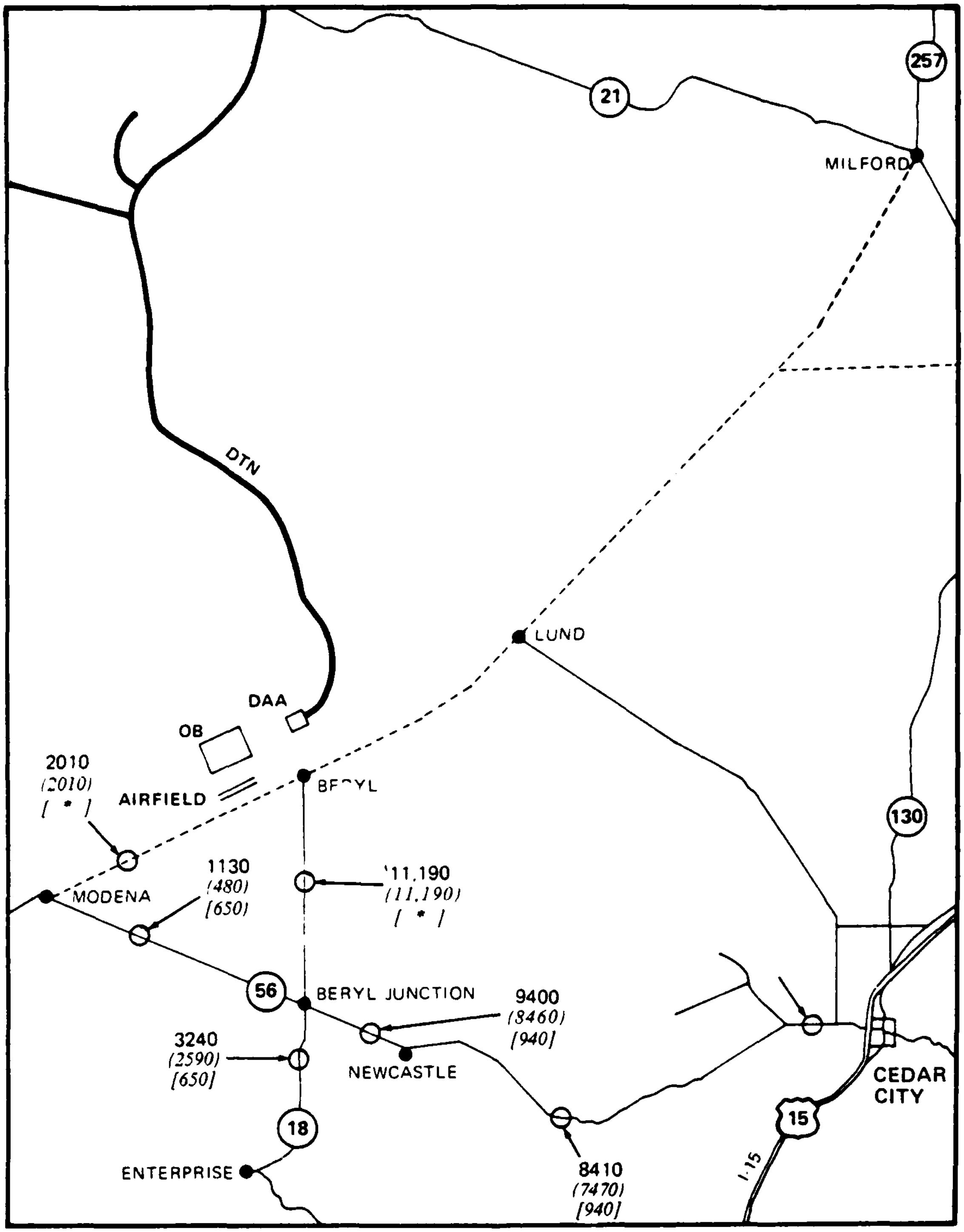
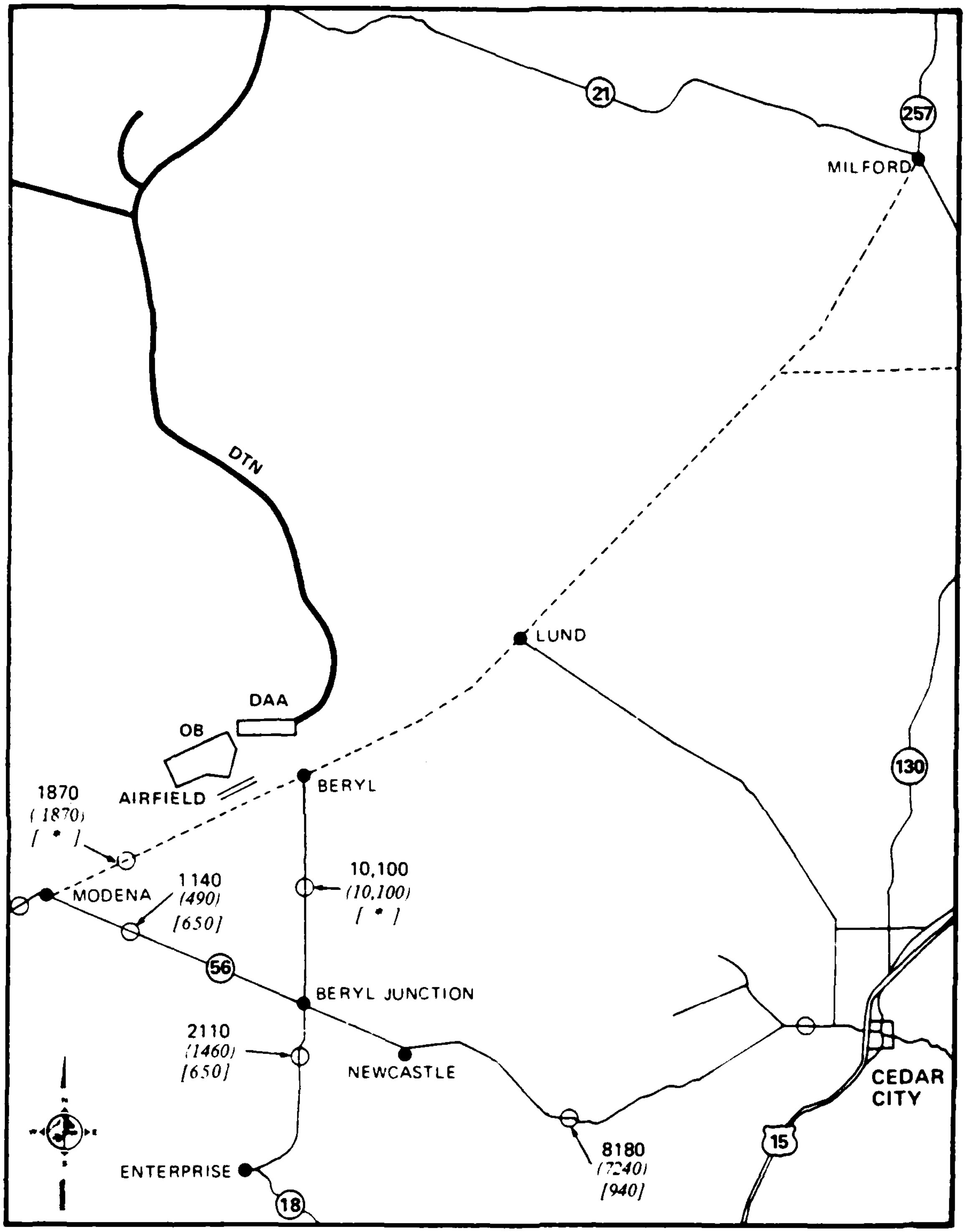


Figure 4.3.1-1. Projected traffic volumes in the vicinity of the Beryl, Utah first OB.



SCHEMATIC NOT TO SCALE 3317-A-1

LEGEND 000 - TOTAL [illegible] TRAFFIC
(000) MX TRAFFIC
[000] 1992 TRAFFIC WITHOUT MX

DASHED LINES INDICATE EXISTING UNPAVED ROADS
[•] INDICATES LOW VOLUME ROAD. CURRENT TRAFFIC DATA NOT AVAILABLE.

Figure 4.3.1-2. Projected traffic volumes in the vicinity of the Beryl, Utah second OB.

During the time these temporary people are living in the area they will be generating traffic. The impacts associated with this short-term level of traffic could affect the communities in either of two ways depending upon how the local communities plan for the traffic. If no special provisions are made to accommodate this short-term growth, the traffic would likely strain the street system, exceeding capacity at critical locations and along major routes. At those locations, congestion would occur, especially during peak periods. The amount and the extent of the short-term impacts would depend upon the location of the temporary housing as well as the location of the new permanent development. However, once the construction period was over, the traffic would subside to the levels anticipated for the long-term operations phase.

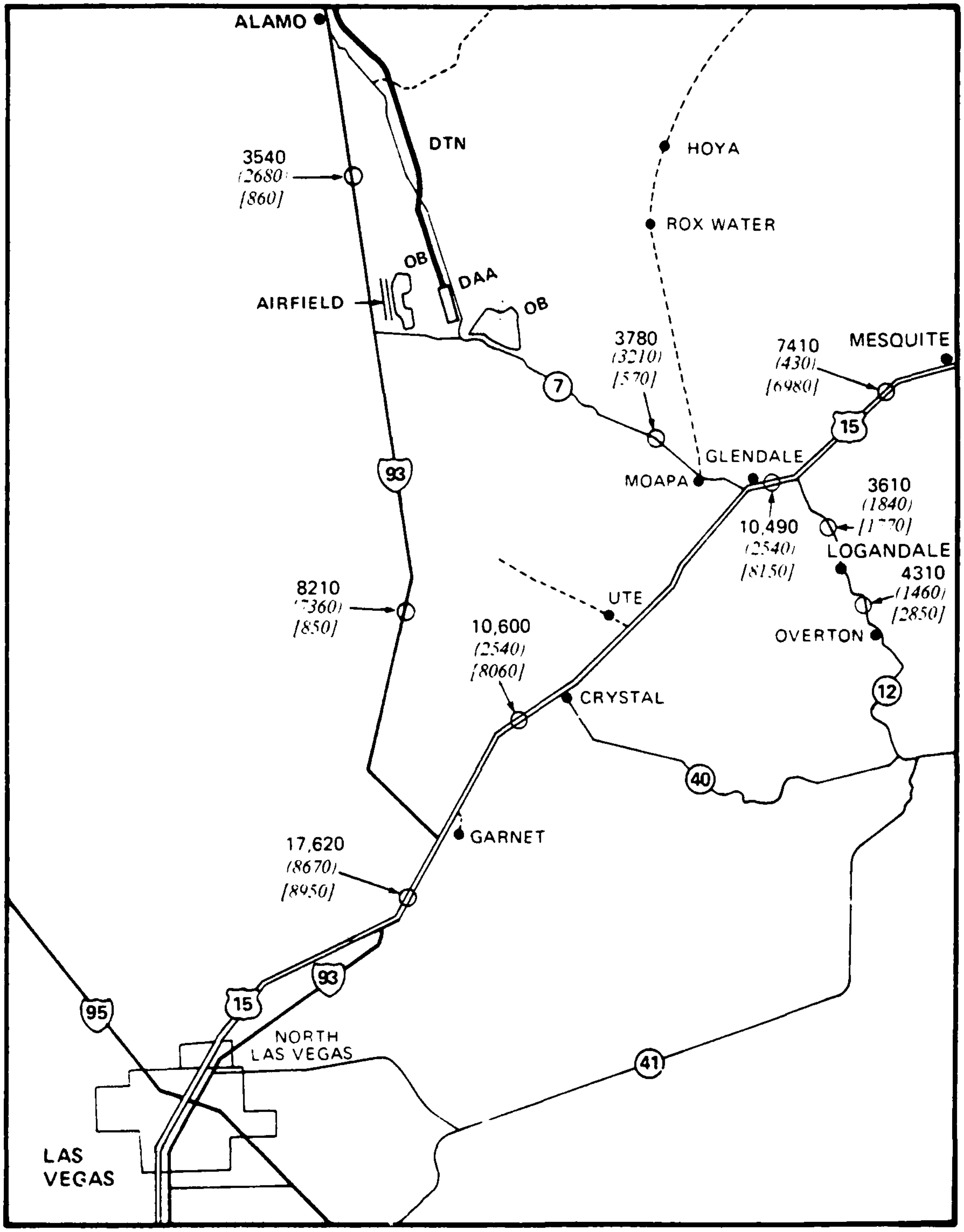
The other possible community reaction would be to expand the street system to accommodate the short-term traffic levels. The traffic would flow smoothly without congestion, but the cost of expanding the road system would be a major impact to the community. Once the short-term effect was over, the road system would be more than adequate to accommodate the long-term traffic levels. The short-term impacts for either of the above two community reactions would be significant. In one reaction the impact would be traffic congestion, while increased costs would be the impact in the other. Impacts on costs to local governments are discussed in ETR-29 (Public Finance).

For a few years during the period when construction and A&CO is still underway, but some operations personnel are present, the anticipated traffic on access roads would be higher than during the long-term operations period. However, improvements to access roads that would be required to accommodate the operations traffic would be adequate for short-term needs if constructed prior to the peak years. Without these improvements, the existing roads would experience congestion.

COYOTE SPRING, NEVADA (4.3.2)

Las Vegas would experience the major increase in population and the corresponding increase in traffic that would occur as a result of construction and operation of an operating base at Coyote Spring, although all surrounding communities would be affected. The anticipated in-migration of over 1,100 new households into these communities under the Proposed Action would generate around 11,000 new trips or traffic movements on an average day once the base is fully operational. Many of these movements will be destined for the operating base. In addition, 1,150 new jobs on the operating base, expected to be satisfied by the indigenous population, will result in many additional trips to the base from the neighboring communities. In general, the impacts associated with this traffic increase would be similar to those for the Beryl site. Refer to Section 4.3.1 for a general discussion of the types of impacts that would occur in the vicinity of the operating base.

Traffic estimates for the vicinity of Coyote Spring--including baseline traffic without the project, M-X-related traffic, and total or composite traffic--are presented for Coyote Spring as a first and a second operating base in Figures 4.3.2-1 and 4.3.2-2, respectively. As shown, there would be about 20 percent more traffic if the site is used as a first operating base, the Proposed Action, than for a second operating base. Refer to Sections 4.3.1 and 6 for a discussion of the assumptions on traffic generation.

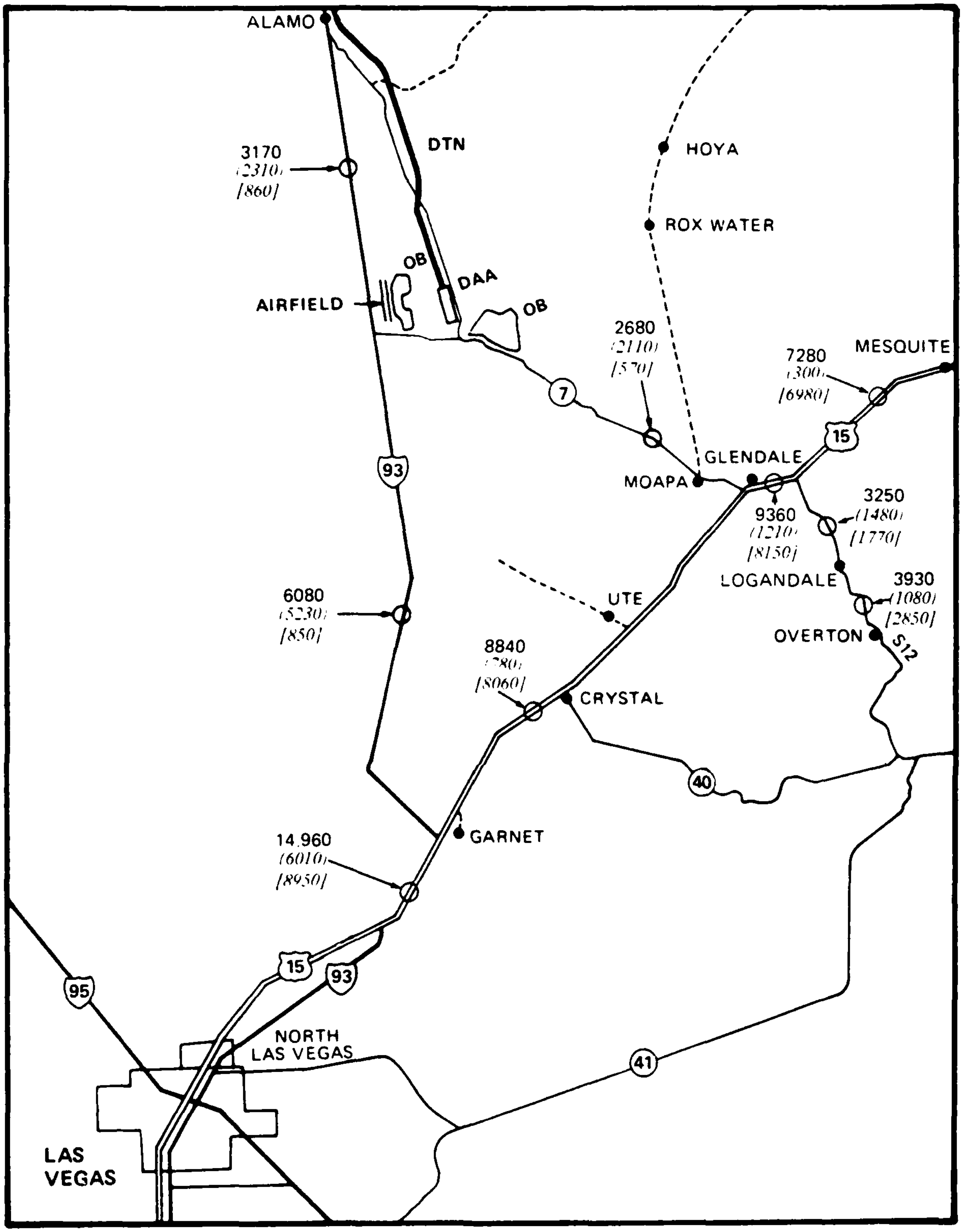


LEGEND 000

SCHEMATIC NOT TO SCALE

2201-A-3

Figure 4.3.2-1. Projected traffic volumes in the vicinity of the Coyote Spring, Nevada first OB.



LEGEND 000 TOTAL 1992 TRAFFIC
(000) MX TRAFFIC
[000] 1992 TRAFFIC WITHOUT MX

SCHEMATIC: NOT TO SCALE

3316-A-1

Figure 4.3.2-2. Projected traffic volumes in the vicinity of the Coyote Spring, Nevada second OB.

The largest impacts on traffic associated with this growth would be on the roads connecting the base with the neighboring communities. U.S. 93 between the proposed operating base site and the intersection of I-15 would have to carry over 8,000 vehicles per day if the first operating base is constructed at Coyote Spring. This would include up to 2,000 commuters, most of whom would travel during peak hours. In order to accommodate this volume of traffic the existing road would have to be improved and widened to four lanes. Near the operating base, a segment of U.S. 93 may have to be relocated to avoid project facilities.

State Highway 7 between the base and the Moapa Valley would have to carry about 3,800 vehicles per day by 1992 which would be a fivefold increase in traffic. Although this would be well below the capacity of the road, each of the small communities could be impacted. Localized traffic problems requiring road improvements may result at some locations on the main routes.

DELTA, UTAH (4.3.3)

The population increases associated with construction and operation of an operating base near Delta would have a significant impact on traffic in the surrounding area. In general, the impact would be similar to those discussed for the Beryl site. Refer to Section 4.3.1.

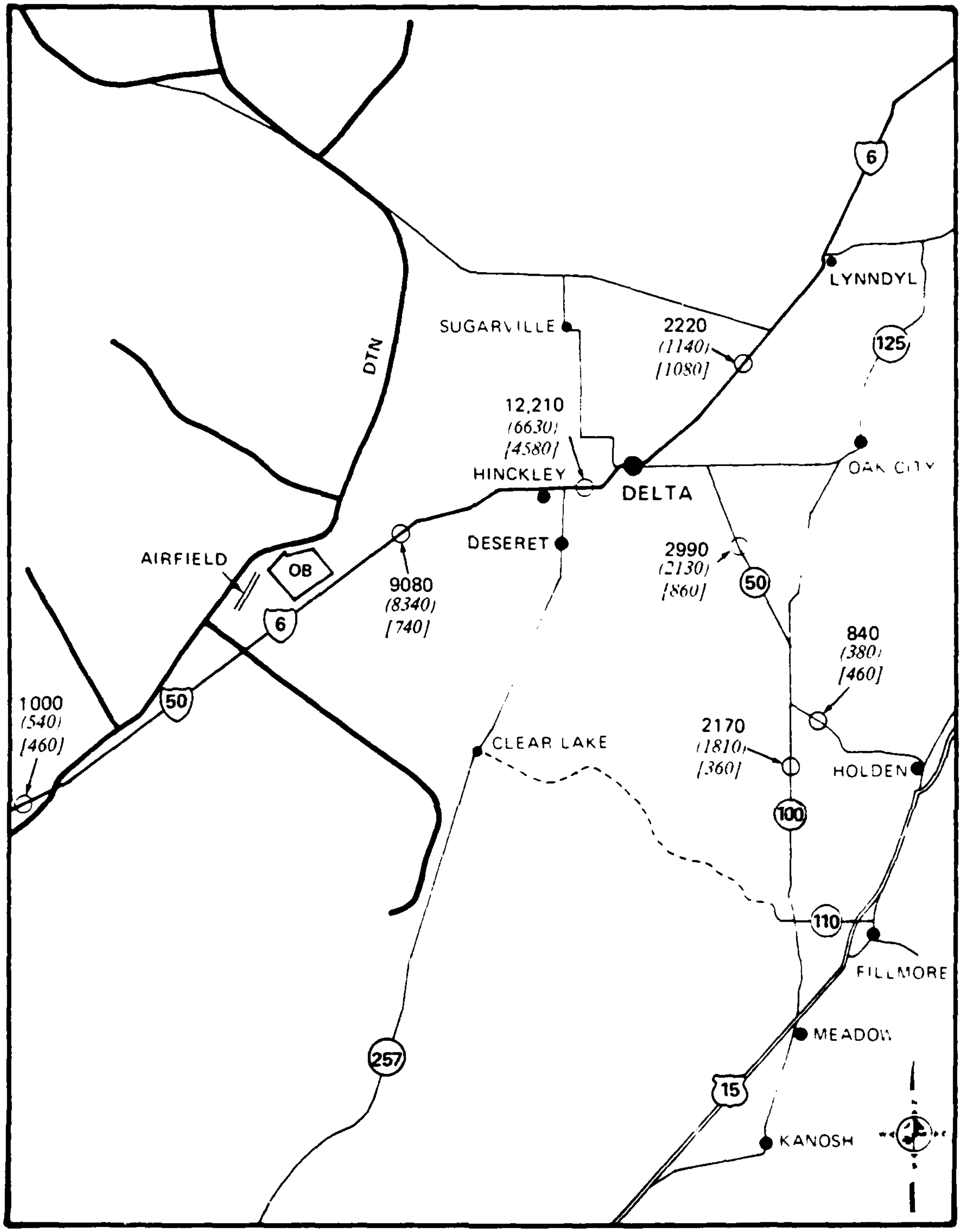
The portion of U.S. 6-50 between the proposed operating base site and Delta would receive the greatest amount of traffic increase due to the project. The anticipated 9,000 vehicles per day, including up to 2,000 commuters, would exceed the capacity of the existing road. Figure 4.3.3-1 presents the anticipated 1992 traffic. That section of highway would have to be improved and widened to four lanes to accommodate the anticipated traffic without severe congestion. (Refer to Section 4.3.1 for a discussion of the assumptions on traffic generation.) Staggered work shifts and substantial use of buses and carpools could reduce the volume of traffic and possibly obviate the need for a four-lane road. However, improvements would probably still be needed at some locations, especially intersections near the base and within the communities of Hinckley and Delta, to adequately handle the traffic. The roads between Delta and the communities of Fillmore, Holden, and Nephi would all have increased traffic.

The anticipated in-migration of around 1,500 new households to communities within Millard County and proximal to the OB site would generate approximately 15,000 trips or traffic movements on an average day. Most of these would probably originate in the immediate vicinity of Delta and Hinckley. Major additions to the street system as well as modifications and improvements to the existing streets would be required.

The other nearby communities would also be affected but to a lesser degree. The extent of the impacts would depend upon the specific growth patterns and the number of persons that choose to live within each community. Localized traffic problems may result at some locations, however, and improvements or modifications may be required at specific points.

ELY, NEVADA (4.3.4)

The population increases associated with construction and operation of an operating base near Ely would have a corresponding impact on traffic in the



LEGEND 000 - TOTAL 1992 TRAFFIC

(000) MX TRAFFIC

[000] 1992 TRAFFIC WITHOUT MX

2195-A-3

SCHEMATIC NOT TO SCALE

Figure 4.3.3-1. Projected traffic volumes in the vicinity of the Delta, Utah OB.

surrounding area. In general, the impacts would be similar to those for the Beryl site. Refer to Section 4.3.1.

The existing highway between the proposed operating base site and Ely would have the greatest increase in traffic as a result of the project. The combination of baseline traffic and M-X-induced traffic would exceed the capacity of the existing road. If the operating base is constructed at this location, the road would have to be improved and widened to four lanes. Figure 4.3.4-1 presents the anticipated 1992 traffic. Implementation of mitigation measures such as staggered work shifts and/or substantial use of buses and carpools could reduce the volume of traffic, but capacity improvements would still be needed especially near the base and on the approach to Ely.

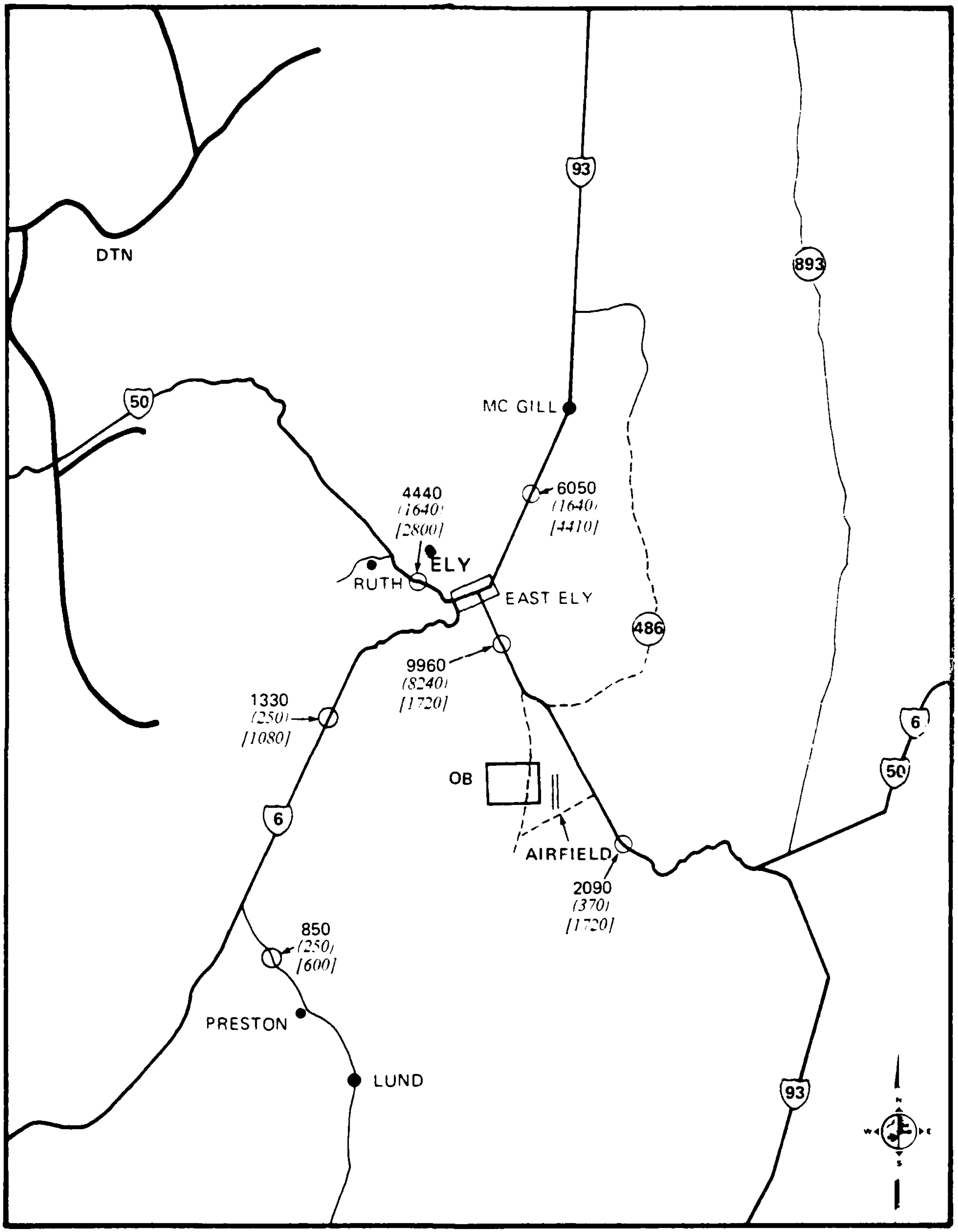
The community of Ely and its immediate vicinity is expected to absorb most of the project-induced growth. The community would almost double in population with a corresponding increase in traffic. Provisions, including new streets as well as new housing, would have to be made to accommodate the anticipated in-migration. The addition of around 1,500 new households in neighboring communities would generate approximately 15,000 trips, or traffic movements, on an average day. Good planning and orderly development can prevent many traffic problems from occurring, but improvements would undoubtedly have to be made at numerous locations on existing streets to properly accommodate the additional traffic. Where these improvements would be needed would depend upon the specific growth patterns that develop. Refer to Section 4.3.1 for a discussion of the assumptions on traffic generation used to develop traffic estimates.

The communities of Ruth and McGill are also expected to experience some growth as a result of the project, but much less than Ely. While some localized traffic problems may occur at a few locations, substantial traffic problems are not anticipated.

MILFORD, UTAH (4.3.5)

The population increases associated with construction and operation of an operating base near Milford would have a corresponding impact on traffic in the surrounding area. In general, the impacts would be similar to those for the Beryl site. Refer to Section 4.3.1.

The community of Milford and the road connection between it and the base would be significantly affected by construction and operation of the operating base. Traffic along the road between the two would be high. Since a significant portion of off-base growth is also expected to occur in Minersville, Beaver, Cedar City, and the other small communities south and east of Milford, improvement of the existing county road between Minersville and the proposed site could direct to that route a significant portion of traffic that would otherwise have to pass through Milford. Under the Proposed Action nearly 10,000 trips per day would be made between the base and neighboring communities. About 20 percent more would use it under Alternative 5 in which Milford would be the first operating base. Figures 4.3.5-1 and 4.3.5-2 present anticipated 1992 traffic for Milford as a first and as a second operating base, respectively. Refer to Section 4.3.1 for a discussion on the assumptions on traffic generation.



LEGEND 000 – TOTAL 1992 TRAFFIC

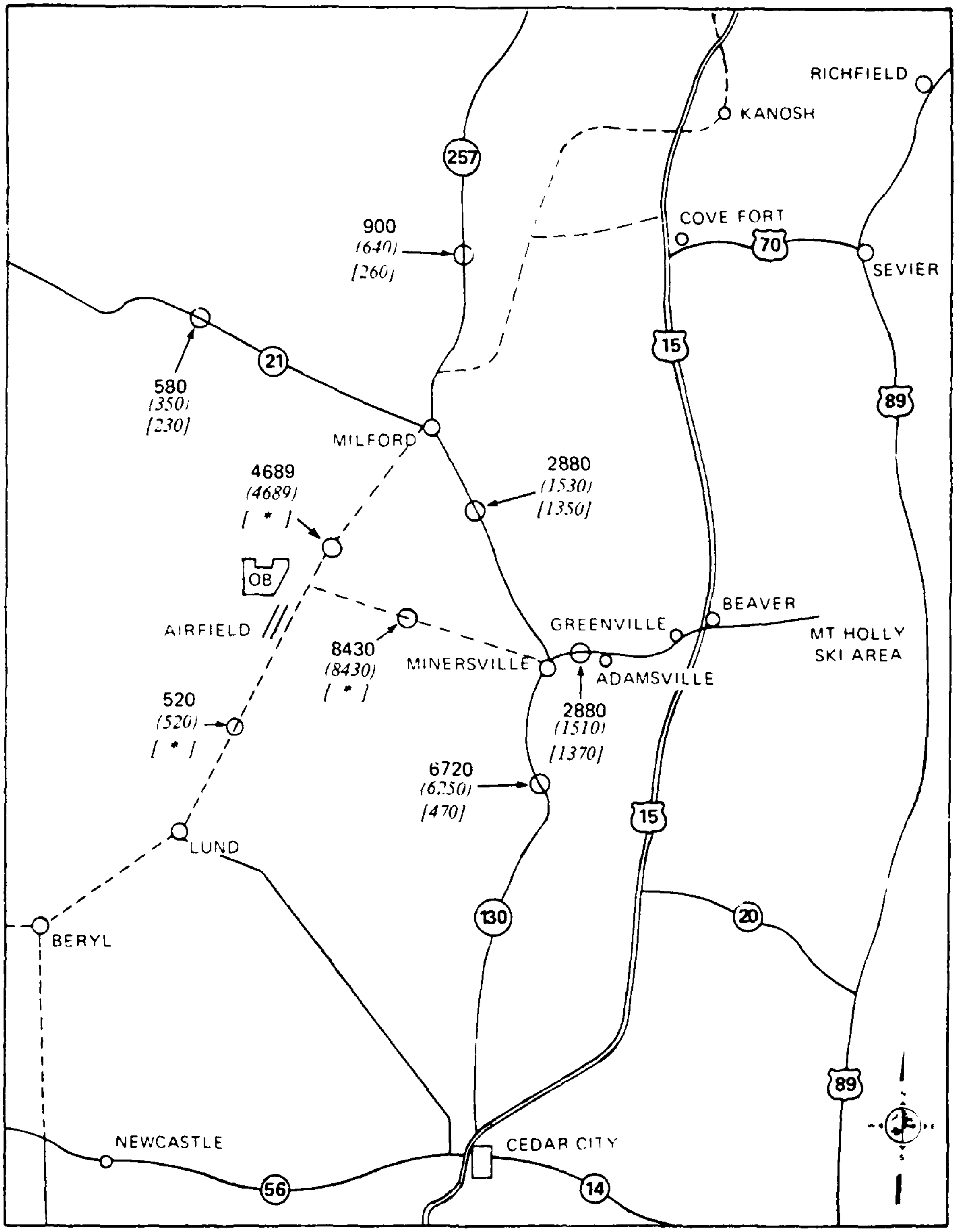
(000) MX TRAFFIC

[000] 1992 TRAFFIC WITHOUT MX

SCHEMATIC NOT TO SCALE

2186-A-2

Figure 4.3.4-1. Projected traffic volumes in the vicinity of the Ely, Nevada second OB.



LEGEND 000 TOTAL 1992 TRAFFIC

(000) MX TRAFFIC

[000] 1992 TRAFFIC WITHOUT MX

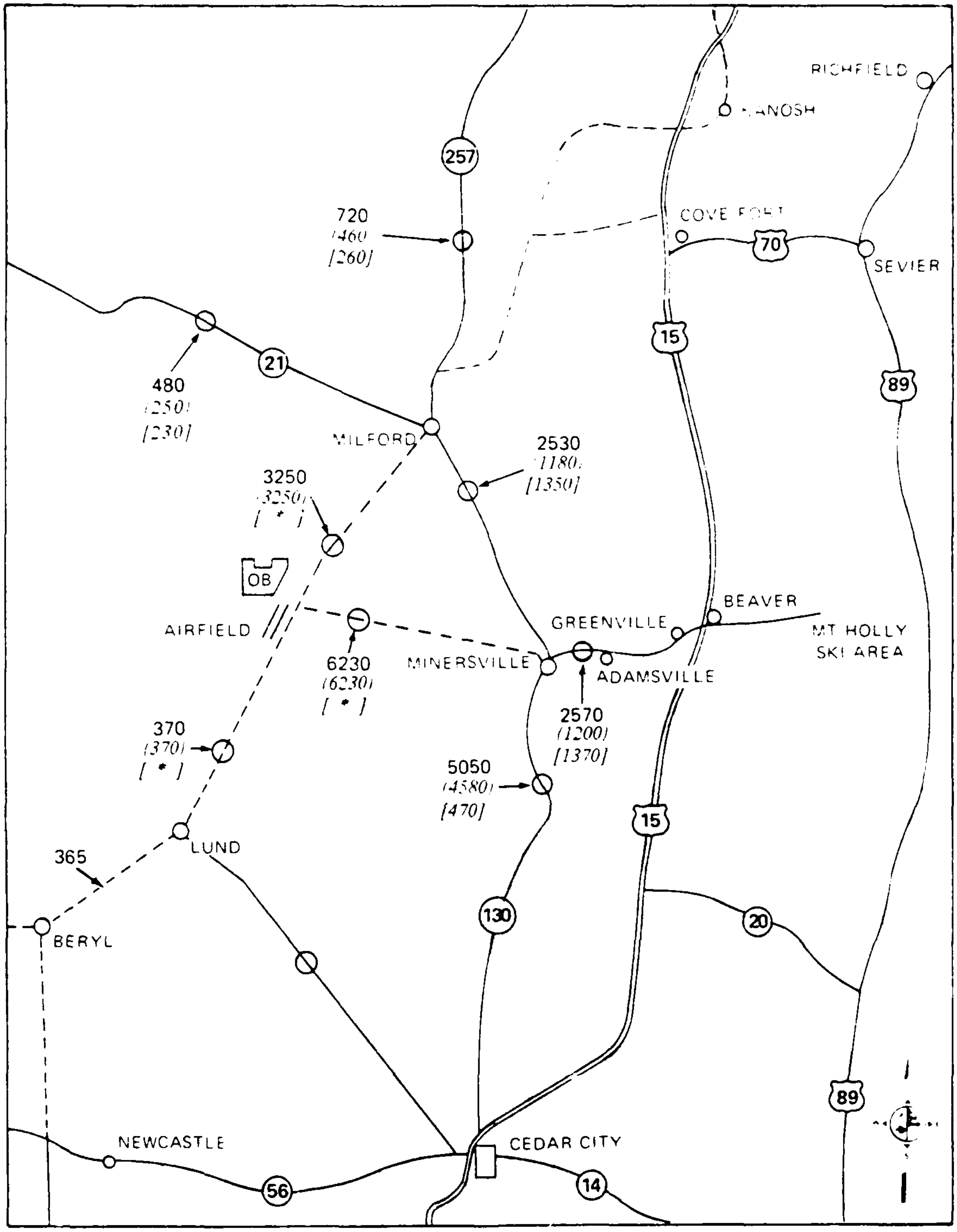
3315-A-1

SCHEMATIC NOT TO SCALE

DASHED LINES INDICATE EXISTING UNPAVED ROADS

[*] INDICATES LOW VOLUME ROAD. CURRENT TRAFFIC DATA NOT AVAILABLE.

Figure 4.3.5-1. Projected traffic volumes in the vicinity of the Milford, Utah first OB.



2573-A-3

LEGEND 000 TOTAL 1992 TRAFFIC
(000) MX TRAFFIC
[000] 1992 TRAFFIC WITHOUT MX

SCHEMATIC NOT TO SCALE

DASHED LINES INDICATE EXISTING UNPAVED ROADS
[*] INDICATES LOW VOLUME ROAD. CURRENT TRAFFIC DATA NOT AVAILABLE.

Figure 4.3.5-2. Projected traffic volumes in the vicinity of the Milford, Utah second OB.

The community of Milford would more than double in size under anticipated growth scenarios. Increases in traffic would be proportionate to overall growth. The anticipated in-migration of over 1,800 new households into communities nearest the OB within the area would generate around 18,000 trips, or traffic movements, daily. Provisions to accommodate this growth, including new streets as well as new housing, would have to be developed. Good planning and orderly development can prevent many traffic problems from occurring, but road improvements will undoubtedly have to be made at numerous locations on the existing street system to accommodate the anticipated traffic. Where these improvements would be needed will depend upon the specific growth patterns that develop.

The community of Minersville will also experience an increase in traffic both from new residences and from traffic passing through it between Beaver and Cedar City and the operating base. Some localized traffic problems requiring improvements will likely occur.

CLOVIS, NEW MEXICO (4.3.6)

Construction of an operating base at Clovis would actually involve expansion of Cannon Air Force Base, an existing facility. Therefore, traffic patterns in the area are not expected to change although the volume of traffic near the operating base would increase substantially. The portion of U.S. 60 between the operating base and Clovis would experience a large increase in traffic as a result of the project but the existing four-lane road should be able to accommodate it. However, some modifications or improvements may be needed at critical intersections. Figure 4.3.6-1 presents anticipated future traffic for the vicinity. Refer to Section 4.3.1 for a discussion of traffic generation.

The in-migration of over 2,000 new households would generate around 20,000 trips or traffic movements within communities near the base. Most of the off-base development would likely occur within Clovis or its suburbs. Consequently, localized short-term congestion could develop at some locations, especially along approaches to U.S. 60 during peak periods, and some modifications or improvements to the street system may be needed at those locations.

The other communities within the area should not be significantly affected by increases in traffic associated with the project, although some critical locations where traffic concentrations occur may need to be modified or improved.

DALHART, TEXAS (4.3.7)

The population increases associated with construction and operation of an operating base near Dalhart would have a corresponding impact on traffic in the surrounding area. In general, the impacts would be similar to those for the Beryl site. Refer to Section 4.3.1.

The proposed site is located approximately 10 mi southwest of the city of Dalhart. U.S. 54 would provide the main access to the base from Dalhart and, consequently, would experience the largest increase in traffic. A minor county road also passes near the proposed site on the east side and this traffic analysis assumes that this road would be improved and that a connection would be made from it to the base. This road would then provide access to the communities of Hartley and

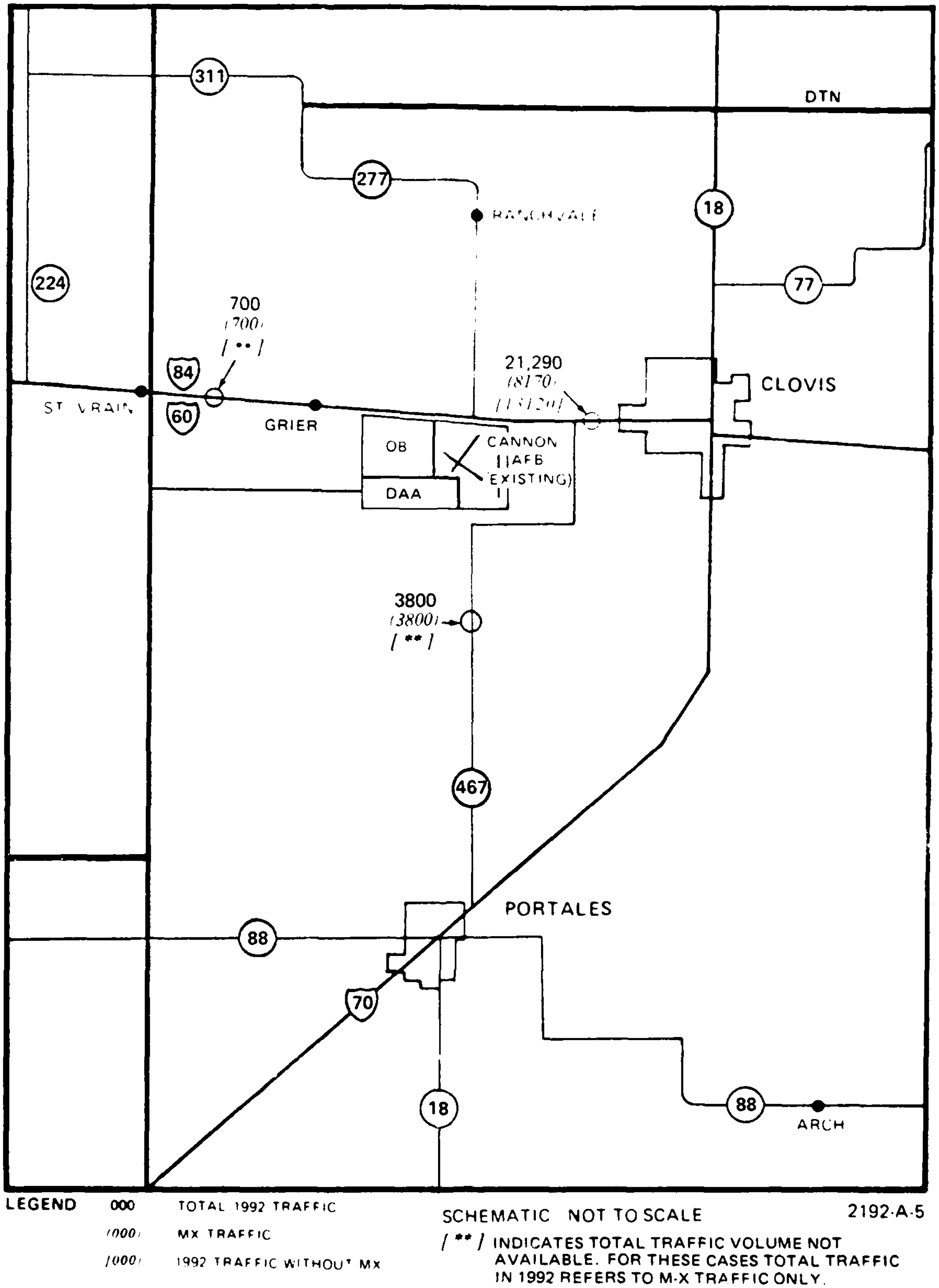
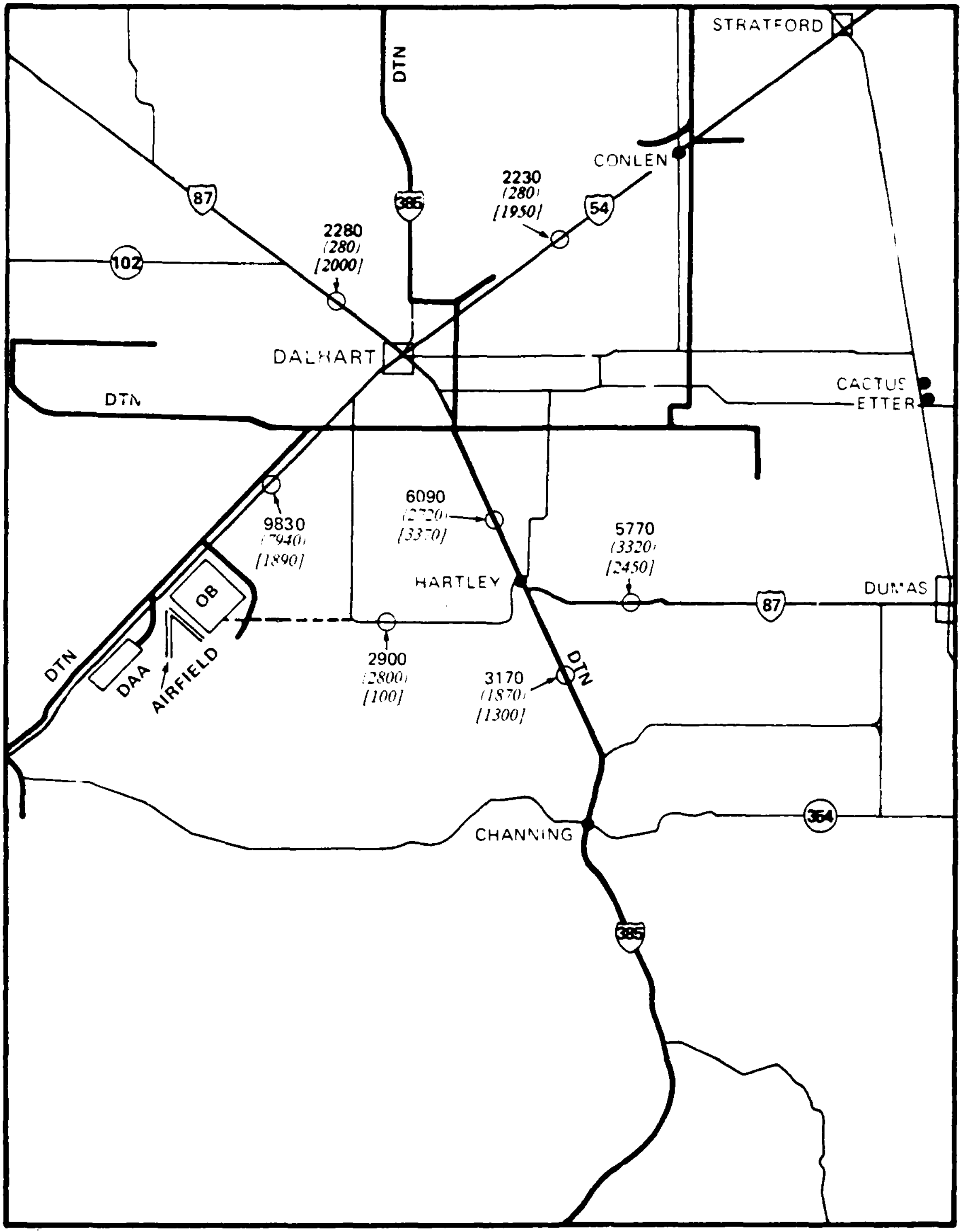


Figure 4.3.6-1. Projected traffic volumes in the vicinity of the Clovis, New Mexico first and second OB.



LEGEND 000 - TOTAL 1992 TRAFFIC

(000) MX TRAFFIC

[000] - 1992 TRAFFIC WITHOUT MX

--- - NEW ROAD TO BE CONSTRUCTED

SCHEMATIC: NOT TO SCALE

2189-A-2

Figure 4.3.7-1. Projected traffic volumes in the vicinity of the Dalhart, Texas second OB.

Dumas and other points south and east. Figure 4.3.7-1 presents future traffic estimated for the vicinity of the base. Refer to Section 4.3.1 for a discussion on traffic generation.

The anticipated in-migration of around 1,800 new households into surrounding communities nearest the OB would generate around 18,000 trips, or traffic movements on an average day within Dallam, Moore, and Hartley counties. Provisions, in the form of new streets in addition to new housing units, would have to be made to accommodate this growth. However, good planning and orderly development can prevent many traffic problems from developing. When, and to what extent, specific improvements would be required will depend upon the growth patterns that develop. Nevertheless, localized traffic problems would occur at a number of locations on the existing street system within the communities and modifications and improvements would be necessary. The communities likely to be affected the most are Dalhart and Hartley.

Dumas would also experience increased traffic although not to the same extent as Dalhart and Hartley since it is farther from the base site. Also, since it is a larger community, the impacts would probably not be significant.

5.0 MITIGATIONS

There are a number of potential mitigation measures that could be implemented to lessen the impacts on transportation facilities due to the M-X project. Primarily these involve measures to reduce the impacts due to increases in traffic. The following sections discuss Air Force mitigations already committed to as well as additional suggested mitigation measures that should be considered. A comprehensive discussion of mitigations for all resources, including traffic, is given in the Mitigations Environmental Technical Report, ETR-38.

Potential mitigations should focus on four types of measures:

- Reduce the opportunity for potential conflicts with existing traffic
- Provide for growth with advanced planning
- Reduce the volume of traffic (especially heavy truck traffic)
- Assist local governments in maintaining and/or improving existing roads

The Air Force will implement a variety of measures to minimize the volume of M-X-related commuter traffic on existing roads. Buses will be provided to transport workers between the construction camps and neighboring communities. Carpools will be encouraged for workers who do not ride the buses. Work shifts will be staggered where possible to reduce peak period traffic volumes. In order to minimize the volume of M-X-related truck traffic on existing roads, the Air Force will require construction traffic to use project roads rather than public roads as much as possible. Where trucks must use existing roads, such as delivering materials and supplies, truck traffic routes will be designated where practical to direct truck traffic to specific routes, thereby limiting the roads which would be affected.

In order to expand and improve the existing transportation system, the Air Force will construct defense access roads where dictated for project needs, during both construction and operation. The specific routes will be determined in further studies. All transportation planning will be coordinated with federal, state, and local transportation agencies. All new roads requried for the project will be constructed and maintained by the Air Force. Improvements to existing roads that would be co-located with project roads will be funded by the Air Force.

The Air Force will advocate community impact assistance for state and local governments to assist in maintaining and improving existing roads that may be damaged by M-X-related traffic.

Other mitigations which the Air Force will implement include paving project roads as early in the project as possible and providing traffic control for all construction traffic to ensure safe and efficient operation.

In addition to these specific Air Force commitments, there are other mitigations which could be implemented to reduce impacts.

Measures to reduce the opportunities for potential conflicts with existing traffic include the following:

1. Temporary facilities, such as construction camps, should be located to avoid channeling undesirable amounts of traffic through small communities or through road segments with inadequate capacity.

2. When conflicts between construction traffic and traffic on existing roads cannot be avoided, measures should be implemented to reduce traffic delays to a minimum and to assure safe operation conditions. Possible measures include construction of detours, temporary use of warning or directional sign, use of flagmen, and temporary traffic signals.

Planning measures that could be included in the cooperative transportation planning process to properly accommodate anticipated growth include the following:

1. The exact locations and sizes of all construction camps and other project facilities should be provided to state and local governments as early as possible so adequate time is available to plan for the growth.

2. Early in the project those locations where temporary housing or other facilities to accommodate construction workers and their dependents are likely to develop should be identified. After identification, planning for orderly development and an adequate road network can proceed.

3. Existing roads that would be utilized by construction traffic should be examined and, where required, improved or reconstructed to accommodate higher traffic volumes and/or heavier vehicles. This should be done in advance of any M-X construction activity. An alternative approach is to allow construction vehicles to utilize these roads without improvement, recognizing that significant damage is likely to occur. Following the construction period, the roads should be resurfaced or reconstructed to their preconstruction quality. This latter approach may not be appropriate in all cases. On some roads the damage might be so great that capacity would be severely reduced and major repairs would be required during the construction period.

4. Road segments or intersections along existing roads where capacity is likely to be approached or exceeded due to project-related traffic should be identified during the design stage so that appropriate improvements can be made before traffic problems occur. These improvements may include roadway widening, roadway reconstruction, truck climbing lanes, improved traffic control devices, overpasses, or various other measures.

The following measures could be implemented to reduce the traffic on existing roads caused by construction of the system:

1. The Air Force has committed to providing buses and encouraging the use of carpools to transport workers. This measure could be more effective if workers were required to use buses or form carpools. This could be implemented by prohibiting private vehicles in the construction area. Workers could be required to assemble at specified locations, possibly temporary park-and-ride lots in neighboring communities, then to ride buses or carpools to the

work areas. This could substantially reduce the number of vehicles, but there is a tradeoff. While one bus could substitute for 30 or 40 private vehicles, reducing traffic, for example, from 1,000 automobile trips to around 30 bus trips, buses would be significantly heavier vehicles. Some roads possibly could carry a larger number of lighter automobiles, but may be damaged by a smaller number of heavier vehicles. This issue would have to be settled on a case-by-case basis during the cooperative transporatation planning process.

2. By providing housing for all or most of the construction workers in the construction camp, the number of commute trips could be substantially reduced. This would not only reduce the amount of commute traffic, it would substantially reduce the amount of temporary facilities required within communities.

Funds could be provided to state and local governments to assist in maintaining and improving roads that would be utilized by construction vehicles. An alternative would be for the Air Force to take over maintenance responsibility during the construction phase. Following construction they could repair all roads damaged during construction and then return maintenance responsibility to the state and local governments.

The above suggested measures would apply primarily to the construction period. However, measures similar to those could be used to reduce the impacts on transportation during the operations phase. These include the following:

1. Traffic between the operating bases and the DDA facilities that would cause operational problems using existing roads should be required to use project roads.

2. Efforts should be implemented to ensure orderly growth and controlled development in areas near the operating bases to accommodate base employees and their dependents that are not provided housing on the base. This includes construction of a good road system in new developments and upgrading existing roads where necessary.

3. Final base locations, personnel requirements, and estimates of total in-migrants should be provided to state and local governments as early as possible so that growth can be properly planned.

6.0 METHODOLOGY AND ASSUMPTIONS - TRAFFIC ESTIMATES

The following sections describe the methodology and assumptions used to estimate the volume of traffic associated with construction and operation of the M-X system. The analysis procedures for the deployment areas (DDA) and the areas surrounding the operating bases are described separately, since the analysis techniques and assumptions are slightly different. In both cases standard traffic forecasting and traffic analysis procedures were used.

The first section discusses the basic theory and applications of traffic forecasting. The second section applies these theories to the specific requirements of this project and includes the basic assumptions and procedures used to estimate the traffic volumes in the vicinity of the operating bases. The third section presents the assumptions and procedures used to estimate the traffic volumes in the deployment area (DDA). The last section describes the procedures for estimating the capacity of a road segment.

All population data and population projections upon which the traffic estimates are based are presented in the FEIS and discussed in more detail in ETR-27 (Population).

6.1 THEORY OF TRAFFIC FORECASTING

Travel depends on population and its needs. It is also related to economic activity, to land use activity and intensity, and to life style. Traffic is a measure of travel by motor vehicles; more specifically, the number of vehicles on a particular segment of road. Methods to forecast and project future traffic are well established in the highway planning process. Underlying the ability to forecast future traffic volumes and patterns is the ability first to understand the relationship between travel and land use (and other socioeconomic factors), and secondly, to accurately forecast population, economic activity, and land use.

The basic theory of transportation planning is that there is an order in human behavior, or, in other words, that trip-making has a high degree of regularity and orderliness (e.g., the same trip to and from work five days each week). If travel were random or chaotic, it would not be possible to reasonably project traffic volumes or patterns. However, orderliness in travel enhances "predictability," and thus provides the basis for traffic forecasting. The regularity of observed travel behavior makes possible reasonably reliable predictions of future travel patterns based on forecasts of future population, employment distribution and characteristics, and other variables, assuming future travel patterns are similar to past, observed patterns. However, traffic forecasting is only as reliable as the other forecasts, such as population and land use, upon which it is based.

Forecasting procedures have been classified into two basic groups: mechanical and analytical. Mechanical methods examine and define past trends of traffic growth, and project them into the future, assuming that future experience will follow a pattern established by past experience (for example, if traffic has been increasing at the rate of 2 percent per year, it could be assumed that it would continue to increase at that rate). Analytical techniques, on the other hand, first

attempt to determine the factors that influence travel patterns, and then express them in a mathematical relationship. Then, significant changes in any of the basic factors (such as the construction of a new military base) can be evaluated in terms of these relationships with reasonable assurance that the consequent change in travel patterns can be reasonably estimated.

The mechanical method was used to estimate future traffic without the project and the analytical method was used to estimate the M-X-related traffic. Briefly, the analytical method used in the study is composed of the following steps:

- o FORECASTING - examining the existing condition, and then predicting, or estimating, what changes there will be to significant factors such as population and land use activity or intensity.
- o TRIP GENERATION AND TRIP DISTRIBUTION - determining the number of trips generated from an activity, land use, or location; breaking trips down by trip purpose and distributing those trips to specific destinations.
- o TRIP (TRAFFIC) ASSIGNMENT - assigning trips (traffic) to an existing or proposed transportation network.

6.2 METHOD OF ANALYSIS - OPERATING BASES

The following section discusses in further detail each of the steps of the analytical process used in this report and the specific assumption and procedures used to estimate the volume of traffic near the operating bases.

FORECASTING (6.2.1)

Two different estimates were necessary to forcast traffic: determination of future baseline traffic without the M-X project; and projection of the additional traffic that would be generated if the project is constructed.

Future Baseline Traffic (6.2.1.1)

The future baseline traffic was estimated based upon the assumption that future traffic would increase in proportion to the increase in the population within the vicinity. Current traffic data were obtained from the various states within the study areas. This information was typically in the form of annual average daily traffic volumes (AADT, or more commonly ADT). "Current" traffic was a relative term, as the available data ranged from 1978 to 1980, depending upon the state.

Future population was based upon an analysis of socioeconomic factors. The trends range from zero growth to significant growth (as much as 80 percent) in the vicinities of the various proposed base sites. These changes in population, in the areas in which they occur, were assumed to cause corresponding changes in traffic volumes. For example, if population was predicted to increase by 20 percent, traffic volumes were assumed to increase 20 percent. The figures in Section 4 show the 1992 traffic projections based upon this equal percentage increase assumption. The description of the model used to predict future population is discussed in ETR-27 (Population).

M-X-Related Traffic (6.2.1.2)

A different procedure was used to project M-X-related traffic. This is because construction of the base would be a major change in the baseline conditions, and could not be accounted for by examination of past trends. M-X-related traffic will be composed of three types: persons who move into the area who will generate new trips; persons who currently live in the area and take jobs on the base and thus will change travel patterns; and persons who move into the area as a result of the base but who do not work on the base itself, who will also generate new trips. During the construction phase there will also be construction traffic including commuter traffic and deliveries of materials and supplies.

This analysis is based upon the assumption that 20 percent of the military personnel and all of the civilian employees would reside off the base in neighboring communities, as would all of the additional in-migrants not employed on the base. (Refer to the Environmental Technical Report on Economics and Population, ETR-27 for a discussion of the method of projecting this indirect growth.) Where these people would reside directly influences where and to what extent traffic impacts would occur; therefore it was necessary to allocate these people to each of the communities in the vicinity of the operating bases. The allocation method used is also included in ETR-27.

Trip Generation (6.2.1.3)

Trip generation is related to the use of land, and land use is most often described in terms of intensity, character, and location of activities. Trip generation, in general, is influenced by such factors as automobile ownership, income, household size, availability of public transportation, density of development, and the quality of the transportation system. Trip generation is generally given in trip generation rates, such as trips per household type, trips per 1,000 square feet of office space, trips per employee, etc. In this study, the major traffic generators are the bases and their various neighboring communities. Further breakdown of the communities was not considered reasonable since further breakdowns would not significantly add to the identification of impacts at the level of detail being discussed in the FEIS. Further detail will be studied during subsequent tiered decisionmaking.

Although there are numerous possible trip purposes (work, shopping, school, recreation, etc.), this study breaks all trips down into three categories: homebased work, homebased nonwork, and nonhomebased. This will give a sufficiently detailed breakdown of trip purposes to make a reasonable projection of traffic volumes and distribution.

Once the number of people who will live on the base and within each of the neighboring communities is established, the next step is to estimate appropriate trip generation rates. Trip generation is the analytical process by which the number of trips that will originate and/or terminate at a particular location is determined. For households it is often given in a rate per household type, such as mobile homes, apartments, single family detached houses, and others. Transportation studies have shown that the number of trips per household varies from approximately 5 to 10 per day for residential units. These trip generation rates vary for types of housing. For

example, a 1980 publication by the Institute of Transportation Engineers contains the following rates for residences:

Single-family detached unit	10.0	vehicle trip ends per day
Apartment, general	6.1	vehicle trip ends per day
Condominium	5.1	vehicle trip ends per day
Mobile Home	5.4	vehicle trip ends per day

The above data are average rates based upon numerous studies throughout the country, and represent average weekday vehicle trips. For this analysis 8 home-based vehicle trips per household was used. This figure was selected based upon an estimate of the housing types that would be constructed for M-X in-migrants near each of the proposed OB sites. Besides these homebased trips, it was assumed that an additional two non-home-based trips per household would be generated.

It was assumed that homebased trips would be 40 percent work-related and 60 percent non-work-related. This amounts to 3.2 trips per day per household to work and 4.8 trips to other destinations. Of the work trips, it is assumed that there would be 2.1 trips per household to the base (this is slightly over one round trip each day). The remaining work trips would be for base employees' dependents working in other areas. (Work trips for a household not having a person employed at the base are distributed differently; this is discussed separately.) Of the remaining work trips, it is assumed that 45 percent would be made to adjacent communities and 55 percent would be made within the community where the trip originated for persons living within small communities. For larger communities, the split was 10 percent to adjacent communities and 90 percent internal based upon the assumption that a higher percentage of trip purposes could be satisfied in the immediate vicinity for larger communities than smaller ones. The homebased nonwork trips made by military personnel and their dependents were distributed 20 percent to the base, 20 percent to communities outside of the originating community, and 60 percent internal to the originating community for small communities and 20 percent, 10 percent, and 70 percent, respectively, for larger communities. The homebased nonwork trips made by civilian employees and their dependents were distributed 20 percent to communities outside the originating community and 80 percent within the originating community for small communities, and 10 percent and 90 percent respectively for larger communities. It was assumed that civilian employees' dependents would not make any trips to the base. The non-home-based trips were distributed 35 percent to the base, 15 percent external to the originating community, and 50 percent internal to the originating community for small communities and 35 percent, 5 percent, and 60 percent for larger communities. For this study, the only communities considered large are Las Vegas, Nevada; North Las Vegas, Nevada; and Clovis, New Mexico.

Some of the base employment will be taken by persons already living in the neighboring communities. The number of trips made by these people will not change significantly, but the trip patterns will. It is assumed that two additional trips per day (one round trip) will be made by each of the individuals between home and the base. Their other trips were assumed to remain the same and, therefore, they are already included in the baseline trips.

For purposes of this report, indirect trips are defined as those trips made by persons who move into the area as a result of employment opportunities associated

with the operating base, but who do not work on the base itself. The actual forecasting of the number of these people was carried out through econometric modeling, which is discussed in ETR-27. The same trip generation rate that was used for base employees is used for indirect trips, except that no trips are assumed destined for the base.

Trips made by persons living on the base (all of them military) are estimated differently. This is primarily because the makeup of this population is substantially different than in civilian communities with larger portions of the military employees not having dependents and some of them living in barrack-type housing. Moreover, because of the facilities available on the base, such as shopping, recreation and, of course, employment, there are considerably fewer inducements to make trips off of the base. This study assumes that each base employee, including those with dependents, would generate one round trip offbase every other day. These include those made by the employee himself or by a member of his family. The trips made totally within the base were not evaluated because they would not use the existing road systems and, therefore, would not cause an impact off the base.

TRAFFIC ASSIGNMENT (6.2.2)

Once the total number of trips originating within each community or on the base was determined along with the trip purpose (e.g., work trip to the base, homebased nonwork trip to another community, etc.) it was necessary to assign the trips to the road network. In this analysis, traffic assignments were almost automatic, as generally there was only one direct route between any two points. In all cases traffic was assigned to the most direct route. The total volume of traffic on any road segment is the sum of the individual assignments.

6.3 METHOD OF ANALYSIS - DEPLOYMENT AREA

CONSTRUCTION TRAFFIC (6.3.1)

Analysis of construction traffic is based upon the conceptual layouts and construction scenarios discussed in Chapter 2 of the FEIS.

Most of the construction traffic would use project roads and thus would not directly impact traffic on public roads. This traffic is discussed, however, since there would be some conflicts at intersections or where construction vehicles may use public roads.

The following is a discussion of the methodology used to compute peak-day construction traffic for the M-X project.

1. The first step was to compute peak and off-peak rates of construction for the three basic components of the M-X project: the shelters, cluster roads, and DTN. Peak rates of construction occur when all activities assocaited with construction of a component are underway simultaneously. Off-peak rates occur at the beginning and end of the construction period when some but not all activities are underway.

2. After-peak and off-peak rates of construction were identified for each phase of construction (shelters, cluster roads, DTN). These daily rates

were then used to compute daily quantities required for these items. For example, each shelter will contain approximately 624 cubic yards of concrete. Assumptions were then made regarding the hauling capacity of each type of truck, for example, 12 cubic yards per concrete truct. By applying these factors, the number of daily trucks required in a construciton group for a particular phase of construction can be determined. To this is added personnel traffic from the construction camp, computed on the basis of total construction camp personnel using the following assumptions:

- o Ten percent of total construction personnel would be Corps of Engineers employees who would utilize small vehicles at 2 persons per vehicle.
- o Thirty percent of total construction personnel would utilize small vehicles at three persons per vehicle.
- o Thirty percent of total construction personnel would be transported to work sites in large buses at 20 persons per vehicle.
- o Remainder of personnel to remain at camp, operating plants, maintaining equipment, etc.

3. The next step was to compute the peak-day traffic. This was determined by estimating periods when more than one of the major construction activities - shelters, cluster roads, and DTN - occurred simultaneously. By noting periods when simultaneous activities occurred, the peak-day traffic was determined. For example, during a portion of the project it would be likely to have peak-day DTN construction and peak-day cluster road construction occurring simultaneously for a period of time. By adding up the traffic associated with each of these activities, composite peak-day traffic on the DTN for a construction group could be calculated.

It should be noted that the calculations of peak-day traffic for the various construction items indicated in Step 2 concentrated only on those traffic volumes which would occur on the DTN and did not include those trucks which travelled exclusively on the cluster roads, such as water trucks used for revegetation and dust control. These trucks would probably have access to a well within the cluster and would not go outside the cluster boundary onto the DTN. It was assumed that the peak-day traffic on the DTN would more than exceed the peak-day traffic on the cluster roads.

Another assumption in arriving at the peak-day traffic rates was the amount of irrigated revegetation which would be required. it was assumed that only partial revegetation would be used in Nevada/Utah, and no revegetation would be used in Texas/New Mexico. This has a significant effect on the traffic volumes since water trucks make up a substantial portion of the traffic involved.

4. After peak-day construction traffic was determined by the above methods, the additional traffic associated with A&CO personnel was determined. The number of A&CO personnel required for each year of construction was provided by the Air Force. These personnel were allocated to each of the construction camps in proportion to the number of shelters which would be constructed by each of them. Three different types of trips were calculated, including bus trips, van trips, and single vehicle trips. After these trips were computed on a daily basis this traffic was overlaid on the peak-day construction traffic to determine composite traffic consisting of A&CO and construction personnel.

COMMUTING AND RECREATION TRAFFIC (6.3.2)

This analysis assumes that a portion of the construction and A&CO personnel will choose to establish living quarters away from the construction camps. The majority of the trips made by these employees will be made via the existing road network between the construction camps and nearby communities and will be made by passenger vehicles, principally during a one-hour band bracketing the normal work hours. This is the traffic that would have the most significant impact on existing roads and traffic.

In computing the construction camp commuting trips, a percentage of the total construction camp personnel was assumed to reside in one or more nearby communities during each year of camp operation. An assumed ridership of 1.2 passengers per vehicle was applied to commuting construction camp personnel, from which round trips per work day were calculated. The round trips were then doubled to obtain daily one-way vehicle trips, which were then assigned to the existing highway system.

In addition to the above daily commute trips, personnel living in the construction camps are assumed to take several recreation-oriented trips during the construction period. These trips will be taken primarily on weekends and will utilize the existing highway system. In general there would be trips out of the deployment areas to large cities or recreation areas or to their permanent homes.

The construction camp recreational trips were calculated assuming that on the peak day such as Friday, 100 percent of the construction personnel who live at the camps would embark on recreational trips. Recreational trips were assumed to have a ridership rate of 1.5 passengers per vehicle. The trips were then assigned to various destinations outside of the deployment areas. At this point, recreational trips to each assumed destination were assigned to the existing highway network. The commuter and the recreational trips shown in Section 4 were shown separately. However, it is probably that at some times commute and recreation traffic would occur simultaneously, such as Friday afternoons. At those times, total traffic would be much higher than the individual portions.

6.4 CAPACITY ANALYSIS

Once traffic is assigned by these procedures it is necessary to examine each segment of road to determine if it has the capacity to accommodate the anticipated volume of traffic. Capacity is defined as the maximum traffic volume per unit of time that can be handled by a given roadway segment under prevailing conditions.

As a quantitative measure, capacity is affected by roadway factors and traffic factors. Roadway factors are physical elements of the roadway design which may affect capacity. These physical elements include: lane width, lateral clearance, shoulders, auxiliary lanes, surface conditions, alignment, and grade. Narrow lanes and limited lateral clearance, poor surface conditions and alignment, and high grades, for example, all adversely affect the capacity of a given roadway segment.

Roadway segments of identical geometry, however, may not have equal capacities. This is due to the effect of traffic factors on capacity. That is, the composition and characteristics of the traffic which uses the road also affect capacity. The traffic factors considered in estimating capacity are: the percentage of trucks and buses in the traffic stream, percentage of turning vehicles, weaving and merging, and other traffic interruptions. These factors, when taken together with the roadway factors, describe the prevailing traffic capacity of a given roadway or roadway segment.

As a result of extensive traffic volume observations and speed-volume relationship studies, numerical values of roadway capacity have been determined for different types of roadways under ideal conditions. Ideal conditions assume uninterrupted traffic flow consisting of passenger cars only, along a roadway witn 12-ft wide lanes, adequate shoulders, and alignment that allows average speeds of 70 mph or greater. Based on these assumptions, capacities of 2,000 passenger cars per hour, total for both directions, for two-lane roadways have been established.

The ideal condition capacities must be modified, however, to reflect the effects of the roadway and traffic factors previously mentioned. Correcting ideal capacity for trucks, varying lane widths, grades, lateral clearance, and other factors will still result in capacities of 1,000 to 1,700 vehicles per hour for most well-designed roadways.

Although capacities are usually computed in terms of vehicles per hour, if an average peak hour factor is assumed, daily capacities can be estimated. For a peak hour factor of 15 percent, assuming an 11-foot land width, no lateral obstructions, and 10 percent trucks in the traffic flow, a daily capacity of 10,000 to 11,000 vehicles is indicated for two-lane roadways on level terrain. The capacity of a four-lane roadway under the same conditions and with 12-foot lanes is approximately 48,000 vehicles per day.

The traffic projections within this report are given in average daily traffic to highlight those locations where large increases in traffic are expected and significant impacts are likely to occur. Section 4 identifies locations where traffic volumes would exceed 1,000 vehicles per day over and above current traffic volumes. The number is used because an increase of 500 vehicles per hour in one direction (assuming the additional trips occur, primarily in one hour periods during morning and afternoon peak periods) is likely to cause a significant reduction in level of service on those roads, possibly exceeding capacity.

Capacity is not normally used as a design criterion for designing or improving roads. For rural roads level of service "B" or "C" is usually used for design purposes. However, when only short-term increases in traffic are expected, lower levels of service are often tolerated when the long-term needs are much less than the short-term needs. This would be the case for most of the roads in the vicinity of

M-X facilities except the operating bases. The specific road improvements and levels of service that would be required for nonproject roads will be identified after the final siting and designing of M-X facilities. In order to mitigate the impacts on existing roads and to identify transportation requirements for both the short term and long term, the Air Force will coordinate transportation planning with federal, state, and local transportation agencies. These and other mitigations are discussed in Section 5 and in ETR-38 (Mitigations).

When performing a capacity analysis, the first step is the determination of the capacity (supply) of the various segments of the highway system. Existing or future traffic volumes are next imposed upon each segment (demand). Relationships are then established between demand and supply, volume and capacity. Obviously, if demand exceeds supply, congestion will occur. The goal of this phase of the analysis is to identity ahead of time where demand will exceed supply so that supply can be increased, or demand redirected. Increasing supply, that is increasing capacity, can range from minor improvements to major actions, such as providing additional lanes to a highway.

7.0 EFFECTS ON RAILROADS AND AIRLINES

7.1 RAILROADS - NEVADA/UTAH

Two railroads currently serve the Nevada/Utah area under consideration. The Nevada Northern Railroad has its southern terminus in Ruth, Nevada, which is about 10 mi northwest of Ely. This line runs north and south and provides passenger rail service to Ely, McGill, Warm Springs, and Currie, Nevada and intersects with the Western Pacific Railroad near Shafter.

The other railroad is a Union Pacific main line which connects Salt Lake City, Utah and Las Vegas, Nevada. It provides good rail access to the proposed base locations at Delta, Milford, and Beryl, Utah, and to a number of other communities. Railroads are shown on Figure 7.1-1.

Under the conceptual construction schedules discussed in the FEIS, during the peak construction year, 1987, approximately 160 carloads per week of additional rail traffic would be required for the Proposed Action and Alternatives 1 through 6. Fewer deliveries would be required in other years. Based upon Union Pacific's proximity to the system, most of the deliveries would probably be made by that line. The existing line is well maintained and the additional freight should not adversely affect the rail line nor interfere with service to the other customers. The M-X-related traffic would provide additional revenue to the company. The increase in rail traffic could possible lead to some adverse impacts on traffic at railroad crossings without grade separations especially within communities. The additional train traffic could mean more or longer delays to motor vehicles waiting to cross. The impacts could be significant within cities such as Las Vegas where the rail lines cross heavily travelled streets. The Nevada Northern rail line is a lesser-used railroad. Depending upon the amount and size of the M-X-related deliveries by this line, some upgrading or additional maintenance may be required to accommodate the additional freight, but the additional traffic would also provide new revenues to the company.

7.2 RAILROADS - TEXAS/NEW MEXICO

Three railroads provide service to the Texas/New Mexico region currently under consideration for the deployment area. The Southern Pacific Transportation Company Line runs east and west through the area. The Atchinson, Topeka and Santa Fe Railroad also has lines in the area serving Vaughn, Clovis, Amarillo, and other cities. The Colorado and Southern Railroad services the northern part of the proposed deployment area with a line running through Dalhart and Amarillo. Railroads are shown on Figure 7.2-1.

Under the conceptual construction schedule contained in the DEIS, approximately 160 carloads per week of additional rail traffic would be required in 1987. Fewer deliveries would be required in other years. Because of their proximities to the area, most of the deliveries would probably be on the Southern Pacific Transportation Company and the Atchinson, Topeka and Santa Fe railroads. The additional freight should not adversely affect the railroads and would provide them with additional revenue.

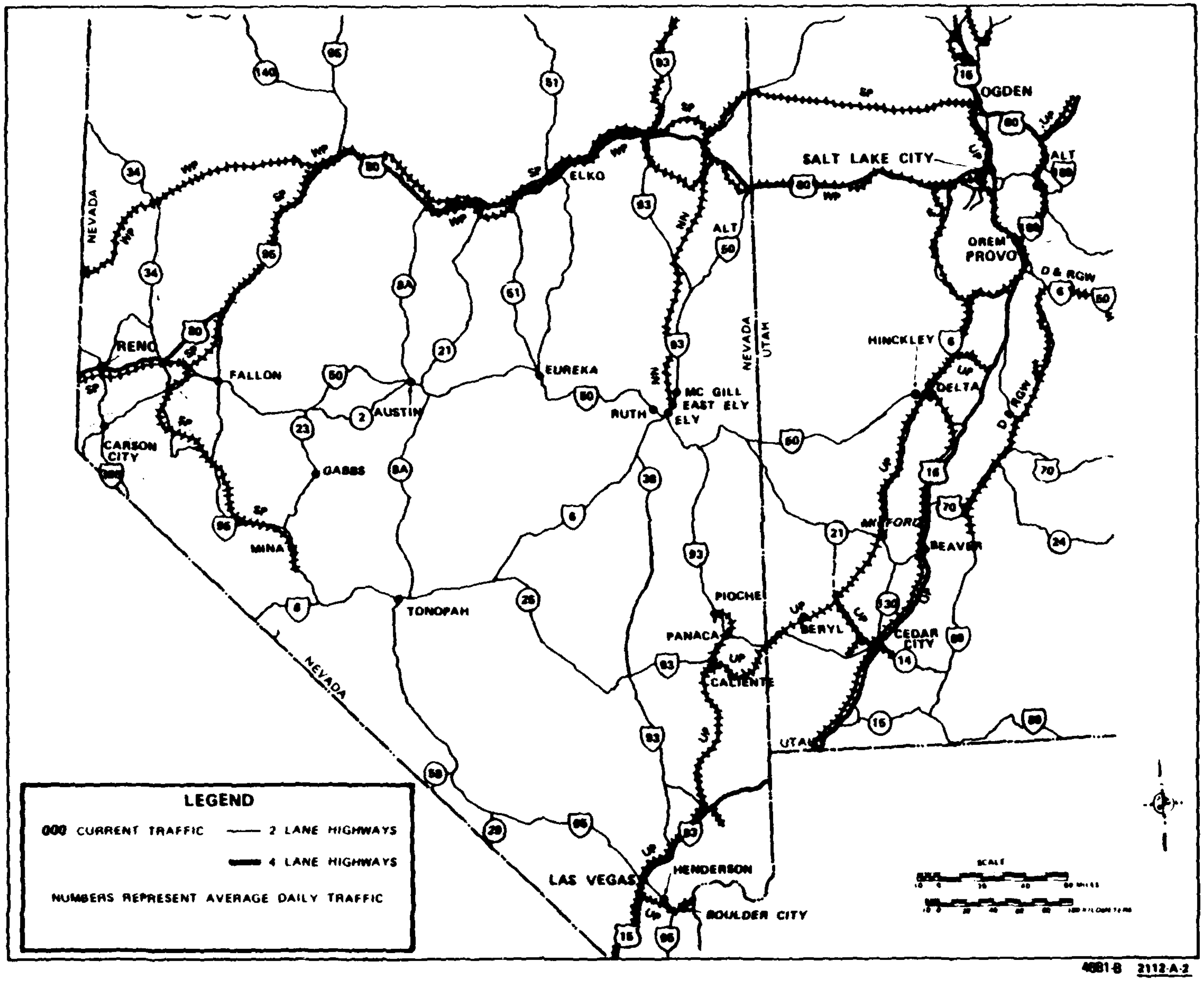


Figure 7.1-1. Existing railroad system, Nevada/Utah.

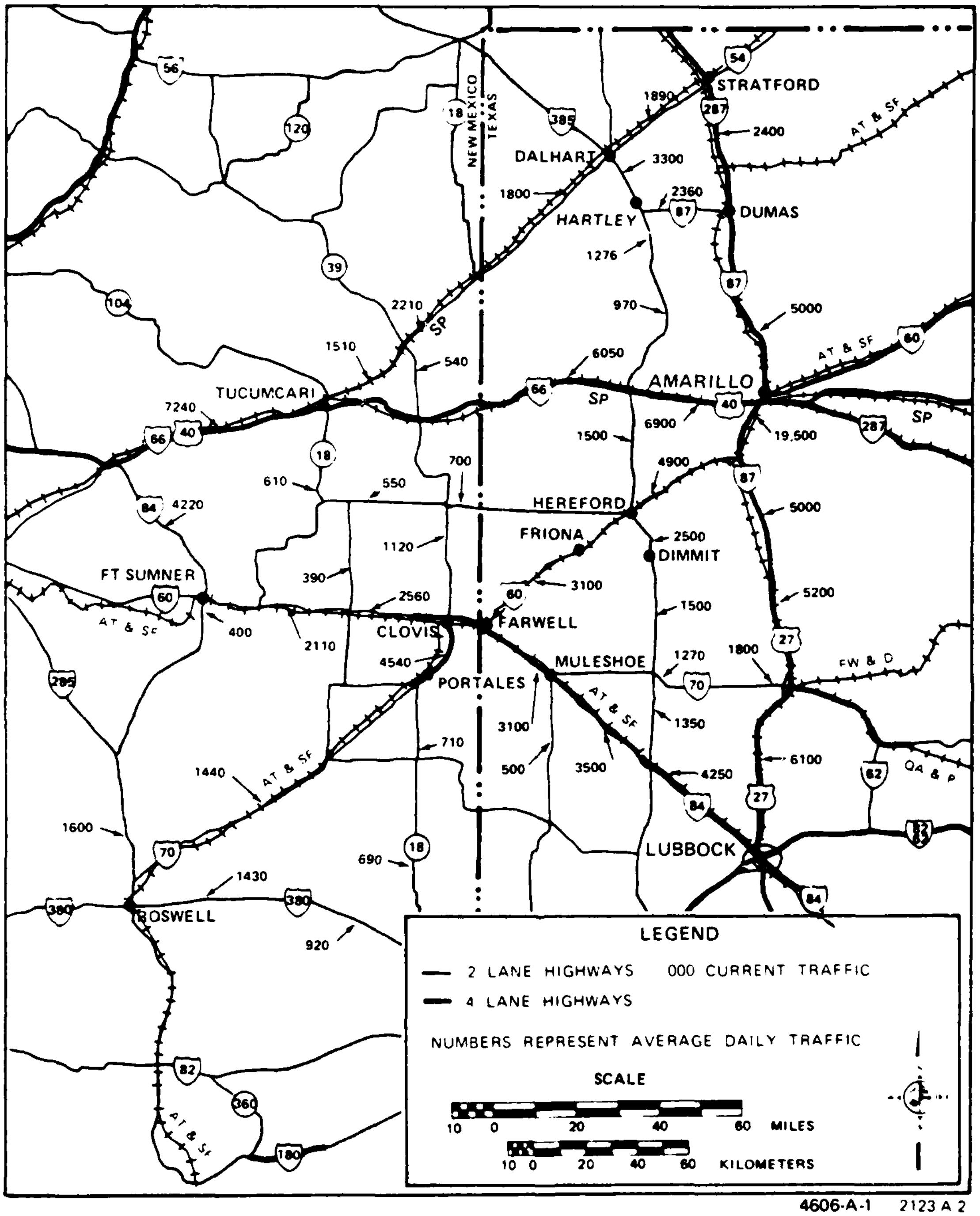


Figure 7.2-1. Existing railroad system, Texas/New Mexico.

7.3 AIRLINES - NEVADA/UTAH

Commercial airline service to the proposed deployment area is provided through major commercial airports at Las Vegas and Reno, Nevada, and Salt Lake City, Delta, and Cedar City, Utah. Las Vegas, Reno, and Salt Lake City have major airports with hundreds of commercial flights daily. Cedar City currently has 26 scheduled commercial flights daily and Ely has 16. Delta currently has no scheduled commercial service. There are also a number of other private and public airstrips throughout the area. The increase in population resulting from construction and operation of the M-X facilities would increase demand for commercial airline service to the region. This increased demand is expected to be accommodated at existing airport facilities.

7.4 AIRLINES - TEXAS/NEW MEXICO

Airline service is provided to the area through commercial airports at Clovis and Roswell, New Mexico, and Lubbock and Amarillo, Texas. Clovis currently has 12 scheduled commerical flights daily and Roswell has 22. Amarillo and Lubbock, Texas, have major airports with hundreds of commerical flights daily. The construction and operation of the M-X system will increase demand for commercial airline service, but the increase should not be too large compared to current demand and the existing airports should be able to accommodate it.

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